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Journal of Religion and Health

ISSN 0022-4197

J Relig Health

DOI 10.1007/s10943-018-0681-4



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Spirituality, Religiosity, Quality of Life and Mental Health Among *Pantaneiros*: A Study Involving a Vulnerable Population in Pantanal Wetlands, Brazil

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Abstract

This study aims to investigate the relationship between spirituality, religiosity (S/R), mental health and quality of life in a vulnerable population in the *Pantanal* wetlands of Brazil. A total of 129 individuals were interviewed. We examined mental health (Hospital Anxiety and Depression Scale), quality of life (SF-12), spirituality (self-spirituality rating scale), religiosity (DUREL) and R/S opinions. Individuals had high levels of spirituality, non-organizational and intrinsic religiosity, but low levels of religious attendance. Most participants said they would like to have their faith addressed by a health professional and that this approach would strengthen their trust on the doctors. Higher levels of spirituality were associated with less anxiety ($\beta = -0.236$, $p < 0.01$) and depressive symptoms ($\beta = -0.398$, $p < 0.001$); higher levels of non-organizational religiosity were associated with less anxiety ($\beta = -0.250$, $p < 0.01$) and depressive symptoms ($\beta = -0.351$, $p < 0.001$); and higher levels of intrinsic religiosity were associated with less depressive symptoms ($\beta = -0.315$, $p < 0.001$). Quality of life was not associated with any religious/spiritual measures.

Keywords Vulnerable population · Underserved community · Spirituality · Religiosity · Mental health · Quality of life

Introduction

Wetlands are found in almost every region of the world (covering 6% of the world's land surface) (Erwin 2009) and are known for their ecological function, animal and plant diversity, as well as for their potential for tourism (Bacon 1987). According to the World Wide Fund for Nature (2017), the major wetlands in the world are Sundarbans (Bangladesh), Lower Danube and Danube Delta (Bulgaria, Moldova, Romania, Serbia and Ukraine), Everglades (USA), Kafue (Zambia), Okavango (Botswana), Kerala Backwaters

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(India), Kakadu Wetlands (Australia), Wasur National Park (Indonesia), Camargue (France) and Pantanal (Brazil, Bolivia and Paraguay). Nevertheless, little is known about the life and beliefs of wetlands' local residents, which in developing countries are considered a very vulnerable population.

A vulnerable population can be defined as one at greater risk of poor health status and healthcare access (Shi and Stevens 2005). They include those economically disadvantaged, racial and ethnic minorities, the homeless and some rural residents (who often face challenges to access healthcare services) (Wilson and Neville 2009).

Vulnerable communities usually experience conditions that negatively impact their mental health. Studies have found that poverty and socioeconomic problems are important factors causing emotional distress (Aidoo and Harpham 2001; Patel et al. 1998). Factors such as poor housing, low income, lack of social support have all been associated with the occurrence of common mental disorders (e.g., major depressive disorder) (Patel and Kleinman 2003). Illiteracy or poor education is also known risk factors for mental disorders (Patel and Kleinman 2003).

In order to deal with emotional distress, vulnerable individuals make use of different strategies such as exercise, listen to music and read (Gardiner et al. 2015). Besides that, these individuals may also use their spirituality and/or religiosity (S/R) to cope with stressors. A study with patients with very little financial resources demonstrated that the majority of them made use of S/R coping strategies to face health problems (Olson et al. 2012). Another study in a Brazilian shantytown found that religious attendance was associated with less alcohol use, alcohol abuse and tobacco use (Lucchetti et al. 2012b).

Indeed, the importance of spirituality and religiosity (S/R) as factors influencing physical and mental health has been increasingly investigated. Studies have found that S/R are associated with improved immune function, lower mortality rate, lower blood pressure and lower cholesterol levels (Koenig 2012; Lucchetti and Lucchetti 2014). Considering mental health, S/R have been associated with lower rates of depression, anxiety, suicide attempts, use and abuse of substance and better quality of life (Moreira-Almeida et al. 2014). However, studies evaluating S/R and their correlations with mental health in vulnerable communities are still scarce.

In Brazil, the wetland residents are called “Pantaneiros,” referring to the name “Pantanal,” the Brazilian wetland. These residents are in a very vulnerable situation, with limited access to education, healthcare and leisure activities, poor financial status, transportation restrictions and housing difficulties (Neto 2006). Therefore, in a way to deal with this situation, our hypothesis is that they may use intrinsic religious and spiritual resources to overcome life challenges and to cope with their mental and physical health issues.

Within this context, the present study aims to investigate the relationship between S/R, mental health and quality of life in a vulnerable population in the *Pantanal* wetlands of Brazil. Understanding the factors that influence the health status of vulnerable individuals is of great importance as a first step in order to develop strategies and policies directed to those individuals.

Methods

Study Design

This is an observational and cross-sectional study carried out in the population assisted at the “Base de Estudos do Pantanal—BEP” [Pantanal Study Base] between March 2014 and

December 2015. All participants gave written informed consent, and the study was approved by the Ethics Committee of the Federal University of Mato Grosso do Sul, Brazil.

Setting

The Pantanal is located in the center of South America and comprises part of Bolivia, Paraguay and Brazil (states of Mato Grosso and Mato Grosso do Sul). It is the largest tropical wetland in the planet, with an area of over 138 square kilometers. Due to its significant biodiversity, the Pantanal was declared a World Heritage by UNESCO. Its population is composed mainly by farmers, riverside communities and individuals who work with tourism (Ribeiro and Moretti 2014).

Passo do Lontra riverside community is located at the Brazilian Pantanal. It is composed by around 30 families (150 individuals) who live mainly from fishery and tourism. Miranda and Corumbá are the closest cities, being around 100 and 130 km away from the community. There are no schools, health centers, nor basic sanitation. The waste of 150 people builds up beneath the houses (which are built on stilts).

The Pantanal Study Base—BEP (<https://propp.ufms.br/coordenadorias/base-de-estudos-do-pantanal/>) is located around *Passo do Lontra* community. It was constructed in 1990 by the Universidade Federal de Mato Grosso do Sul—UFMS [Federal University of Mato Grosso do Sul]. The university aimed to provide a place wherein students could study and explore the Brazilian Pantanal as well as develop research and extension projects.

Since 2009, students and professors from health-related courses of UFMS (Medicine, Dentistry, Nursing and Pharmacy) go to BEP once a month and provide multidisciplinary care to the population. During two days the community has access to medical appointments, medications, simple laboratory examinations and dental care.

Participants

All adult individuals who received medical and/or dental care at BEP in the years 2014 and 2015 were invited to participate. We excluded those under 18 years old and those without capacity to understand the instruments' questions.

Definitions

In the study we used the following definitions (Koenig et al. 2001):

- Spirituality: “personal quest for understanding answers to ultimate questions about the life, about meaning and about the relationship with the sacred or the transcendent which may (or may not) lead to or arise from the development of religious rituals and the formation of the community”.
- Religion: “an organized system of beliefs, practices, rituals, and symbols designed to facilitate closeness to the sacred or transcendent”
- Religiosity: “extent to which an individual believes, follows, and practices a religion”. It can be organizational (public, social and institutional practices such as going to a church or spiritual temple), non-organizational (private, personal and individual practices such as pray, read S/R books, watching religious TV shows) and intrinsic (religion is central in the individual's life and it is perceived as an end in itself).

Data Collection Instruments

Considering the poor level of formal education among individuals from the population studied, all the instruments were administered by researchers previously trained. The following instruments were used in the study:

- *Sociodemographic data* age, gender, education level, profession, marital status and family income.
- *Anxiety and Depression* The Hospital Anxiety and Depression Scale (HADS) was used to assess anxiety and depression symptoms. The HADS contains 14 Likert-type questions. It consists of two subscales, for anxiety and depression, with seven items each. The overall score in each subscale ranges from 0 to 21. The scale was initially developed to assess non-psychiatric clinical patients, and subsequently, it was used in non-hospitalized patients and individuals without disease. It is intended to detect mild degrees of disorders. The HADS avoids interference of somatic disorders in the score; it is easy to handle and of quick execution (Marcolino et al. 2007). Participants were asked to respond based on how he felt during the 30 days prior to the questionnaire response. As in other studies (Marcolino et al. 2007; Zigmond and Snaith 1983), a score of 9 or higher in a specific subscale was considered positive.
- *Health-Related Quality of Life Short-Form 12 (SF-12)* was the instrument used to evaluate quality of life. This questionnaire is composed of 12 questions that access two domains: physical (PCS) and mental (MCS). It covers functional and physical health, pain, vitality, emotional aspects and mental health, social aspects and general health (Silveira et al. 2013). Participants were asked to answer the questionnaire considering the 4 weeks prior to application of the instrument.
- *Religiosity* Duke Religious Index (DUREL) was used to access religiosity. The DUREL scale contains five items which address organizational, non-organizational and intrinsic religiosity. The Portuguese version of the scale (PDUREL) was validated in a study involving vulnerable low-income adult individuals (Lucchetti et al. 2012a). PDUREL instrument was well accepted and easily understood and demonstrated good internal consistency. Thus, the PDUREL scale is a fast and comprehensible instrument, ideal for studies involving vulnerable populations.
- *Spirituality* the Portuguese version of the Spirituality Self Rating Scale (SSRS) was used to access spirituality. It consists of 6 Likert-type questions designed to reflect a more intimate (as opposed to external and social) orientation of the spiritual dimension (Gonçalves and Pillon 2009). The scale aims to measure to what extent the subject considers or judges spiritual issues to be important to his/her life. The Portuguese version of SSRS was validated in Brazil in 2008, in a study with patients using psychoactive substances (Gonçalves and Pillon 2009).
- *Participants' opinions* a questionnaire composed of 6 Likert-type questions sought to assess participants' opinions about (1) the impact of faith, beliefs and/or religion on physical and mental health, (2) the importance of accessing spirituality in clinical settings, (3) the impact of the approach of spirituality during a clinical appointment on the participant's opinion about the health professional and finally (4) if participants had ever been asked by a health professional about their spirituality and/or religiosity.

Data Analysis

Data from the questionnaires were entered into an Excel database and analyzed using Statistical Package for Social Sciences program (SPSS), version 17.0 (SPSS Inc.). A $p < 0.05$ was considered significant.

Frequencies, percentage, means and standard deviation were used to present descriptive data. Inferential analyses were carried out in the following way. First, an exploratory Pearson correlation matrix was carried out among all variables. Then, linear regression models with HADS (anxiety and depression) and SF-12 (physical and mental health) as dependent variables and spiritual and religious measures as independent variables were performed, adjusting for age, gender, education and income.

Results

A total of 129 individuals were interviewed. Table 1 shows sociodemographic data. Most participants were men (54.3%), married (63.6%), Mulattos (56.6%), with low education (59.7%), very low income—up to US\$440.00 (72.9%) and with a mean age of 36.6 years (SD: 12.5).

Concerning the religious and spiritual aspects, the most common religion was Catholic (45%), followed by Evangelical/Protestant (31%) and those who did not practice any religion (27%). Table 2 shows the results regarding the religiosity of participants. In summary, patients have low religious attendance, high private religious activities and high intrinsic religiosity.

In regard to mental health, the mean score of HADS anxiety was 6.6 (SD: 4.2) and 38 participants (29.4%) were considered to suffer from anxiety (scored 9 or higher). On the HADS depression subscale the mean score was 3.5 (SD: 3.1) and 11 individuals (8.5%) were considered to suffer from depression (scored 9 or higher).

Table 3 shows that anxiety was more frequent among women ($r = 0.441$; $p < 0.01$) as well as depression ($r = 0.271$; $p < 0.01$). Individuals who scored higher on depression also tended to score higher on anxiety ($r = 0.674$; $p < 0.01$). Participants who scored higher on spirituality (SRSS) also tended to score higher on religious measures. Individuals with higher scores on SRSS also tended to present less anxiety ($r = -0.249$; $p < 0.01$) and depression ($r = -0.377$; $p < 0.01$). Considering religiosity, participants with higher non-organizational religiosity tended to present less anxiety ($r = -0.244$; $p < 0.01$) and depression ($r = -0.315$; $p < 0.01$). Participants who presented higher intrinsic religiosity also tended to present less anxiety ($r = -0.185$; $p < 0.05$) and depression ($r = -0.315$; $p < 0.01$). Similar correlations were not found considering organizational religiosity. Significant correlations were not found regarding quality of life (PCS and MCS) and mental health.

After performing the linear regression models adjusted for sociodemographics (Table 4), we found that: (a) higher levels of spirituality were associated with less anxiety ($\beta = -0.236$, $p < 0.01$) and depressive symptoms ($\beta = -0.398$, $p < 0.001$), (b) higher levels of non-organizational religiosity were associated with less anxiety ($\beta = -0.250$, $p < 0.01$) and depressive symptoms ($\beta = -0.351$, $p < 0.001$), and (c) higher levels of intrinsic religiosity were associated with less depressive symptoms ($\beta = -0.315$, $p < 0.001$).

Table 5 shows participant's opinions regarding the role of S/R on health and health care. Most individuals (87.9%) believe that S/R influence on physical and/or mental health,

Table 1 Sociodemographic characteristics

	<i>n</i>	%
Sex		
Male	70	54.3
Female	59	45.7
Ethnicity		
Caucasian	36	27.9
Afro descendent	19	14.7
Mulatto	73	56.6
Indigenous	1	0.8
Marital status		
Single	39	30.5
Married	82	64.1
Widow (er)	3	2.3
Divorced	4	3.1
Educational level		
Never went to school	4	3.0
Primary school	73	56.6
Secondary school	33	25.6
High school	19	14.8
University degree	0	0.0
Household monthly income (US\$)		
Less than \$140	3	2.3
Between \$140 and \$290	41	31.8
Between \$290 and \$440	50	38.8
Between \$440 and \$590	16	12.4
Between \$590 and \$880	13	10.1
More than \$880	6	4.7
Religion		
Catholic	58	45.0
No religion	27	20.9
Protestant/Evangelical	41	31.9
Spiritist	3	2.3

84.4% believe that “the absence of faith and/or religion influence on the onset of depression and/or anxiety”, 87.4% referred it is important for health professionals to ask patients about their faith and/or religion, 73.2% of individuals in the sample would like to have their faith and/or religious beliefs addressed by their physicians, 62.5% of them said they would trust more on their doctors if he addressed faith and/or religious beliefs during a medical appointment, and only 3.9% of individuals said they would feel uncomfortable if a health professional asked them about their beliefs. However, only 21.1% said that they had already been questioned about their S/R by their doctors.

Table 2 Religious characteristics (items by DUREL scale)

	<i>n</i>	%
How often do you attend church or other religious meetings?		
More than once/week	3	2.3
Once a week	3	2.3
A few times a month	28	21.7
A few times a year	71	55.0
Once a year or less	15	11.6
Never	9	7.0
How often do you spend time in private religious activities, such as prayer, meditation or Bible study?		
More than once a day	20	15.5
Daily	74	57.4
Two or more times/week	10	7.8
Once a week	3	2.3
A few times a month	8	6.2
Rarely or never	14	10.9
In my life, I experience the presence of the Divine (<i>i.e.</i> , God)		
Definitely true of me	94	73.4
Tends to be true	30	23.4
Unsure	4	3.1
Tends not to be true	0	0
Definitely not true	0	0
My religious beliefs are what really lie behind my whole approach to life		
Definitely true of me	62	48.1
Tends to be true	44	34.1
Unsure	7	5.4
Tends not to be true	7	5.4
Definitely not true	9	7.0
I try hard to carry my religion over into all other dealings in life		
Definitely true of me	54	41.9
Tends to be true	32	24.8
Unsure	19	14.7
Tends not to be true	10	7.8
Definitely not true	14	10.9

Discussion

Spiritual and religious beliefs were common and associated with mental health, but not quality of life in this vulnerable Brazilian population. In addition, participants were open and had positive opinions toward the relationship between spirituality and health. These results could have further implications in the underserved population research.

Concerning the association between R/S and mental health, our findings are in accordance to other studies in the general population (Moreira-Almeida et al. 2014), as well as in

Table 3 Correlations between spirituality, religiosity, socioeconomic data, quality of life and mental health

	SRSS	OR	NOR	IR	Age	Sex	Educ	Income	SF-12 PCS	SF-12 MSC	Anx	Dep
SRSS	1											
OR	0.412**	1										
NOR	0.536**	0.426**	1									
IR	0.660**	0.394**	0.518**	1								
Age	0.216*	0.118	0.296**	0.258**	1							
Sex	-0.038	0.121	0.008	0.042	-0.258**	1						
Educ	-0.184*	-0.060	-0.148	-0.111	-0.380**	0.245**	1					
Income	-0.056	0.063	0.061	0.058	0.157	-0.147	0.043	1				
SP-12 PCS	0.014	-0.046	-0.049	0.025	0.222*	-0.064	-0.039	0.118	1			
SF-12 MSC	0.102	0.055	0.006	0.157	0.149	-0.001	-0.054	0.053	0.046	1		
Anxiety	-0.249**	-0.044	-0.244**	-0.185*	-0.198*	0.441**	0.116	-0.041	-0.044	0.015	1	
Depression	-0.377**	-0.103	-0.315**	-0.282**	-0.080	0.271**	0.142	-0.012	-0.025	-0.016	0.674**	1

N = 129; *p < 0.05; **p < 0.01

SRSS self-spirituality rating scale, OR organizational religiosity, NOR non-organizational religiosity, IR intrinsic religiosity, Educ education, Anx anxiety, Dep depression

Table 4 Linear regression models between spiritual/religious measures and mental health and quality of life

	Unadjusted model		Model 1	
	<i>B</i> (SE)	β	<i>B</i> (SE)	β
SF 12 PCS				
SRSS	0.026 (0.164)	0.014	–	–
OR	– 0.377 (0.728)	– 0.046	–	–
NOR	– 0.256 (0.460)	– 0.049	–	–
IR	0.077 (0.274)	0.025	–	–
SF 12 MCS				
SRSS	0.284 (0.246)	0.102	–	–
OR	0.680 (1.100)	0.055	–	–
NOR	0.045 (0.696)	0.006	–	–
IR	0.731 (0.409)	0.157	–	–
HADS A				
SRSS	– 0.249 (0.086)	– 0.249**	– 0.237 (0.081)	– 0.236**
OR	– 0.197 (0.395)	– 0.044	–	–
NOR	– 0.686 (0.242)	– 0.244**	– 0.703 (0.231)	– 0.250**
IR	– 0.309 (0.146)	– 0.185	–	–
HADS D				
SRSS	– 0.279 (0.061)	– 0.377***	– 0.295 (0.061)	– 0.398***
OR	– 0.341 (0.292)	– 0.103	–	–
NOR	– 0.657 (0.176)	– 0.315***	– 0.731 (0.178)	– 0.351***
IR	– 0.351 (0.106)	– 0.282**	– 0.389 (0.106)	– 0.315***

Model 1: Sex, income, education, age

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

studies carried out specifically in vulnerable persons. Kilbourne et al. (2009) examined low-income people with diabetes and found that several religious measures were negatively associated with depressive symptoms. Likewise, Garisson et al. (2005) evaluated rural low-income mothers and also found that both religious beliefs and faith community involvement were negatively related to depressive symptoms. Despite these previous results, to our knowledge, this is the first study to seek this relationship in this very particular group, wetlands' residents. The advantage of studying this group is that they have limited access to almost all resources, and therefore, they are not able to use other coping strategies, such as leisure activities, support groups or psychotherapy. Within this context, religious activities seem to be a very important way to cope in this population.

Supporting this hypothesis, we found high levels of religiousness in this group as a whole. However, it is interesting to note that religious attendance levels were very low (only 4.6% attended to religious services once a week or more). This is contrary to what was found by Lucchetti et al. (2012a) in a previous underserved Brazilian population study, in which 35.5% of low-income shantytown inhabitants attended to religious services once a week or more. This contradictory finding can be justified by the fact that in the shantytown study there were several religious services, whereas in this wetland population, there is only one Catholic chapel offering service once a month. Thus, these wetland inhabitants

Table 5 Patients' opinions toward the relationship between spirituality, religiosity and health

	<i>n</i>	%
Faith, beliefs and/or religion influence on physical and mental health		
Strongly agree	60	46.5
Agree	53	41.4
Neutral	3	2.3
Disagree	9	7.0
Strongly disagree	3	2.3
The absence of faith and/or religion influence on the onset of depression and/or anxiety		
Strongly agree	55	43
Agree	53	41.4
Neutral	3	2.3
Disagree	14	10.9
Strongly disagree	3	2.3
I think it is important for health professionals to ask patients about their faith and/or religion		
Strongly agree	50	39.4
Agree	61	48.0
Neutral	9	7.1
Disagree	6	4.7
Strongly disagree	1	0.8
I would feel uncomfortable if a health professional asked me about my beliefs, spirituality and/or religion		
Strongly agree	0	0
Agree	5	3.9
Neutral	5	3.9
Disagree	48	37.5
Strongly disagree	70	54.7
I think it is important for health professionals to ask patients about their faith and/or religion		
Strongly agree	50	39.4
Agree	61	48.0
Neutral	9	7.1
Disagree	5	4.7
Strongly disagree	1	0.8
I would trust more in my physician if he/she addressed my faith and/or religious beliefs		
Strongly agree	29	22.7
Agree	51	39.8
Neutral	40	31.9
Disagree	8	6.3
Strongly disagree	0	0
Has any physician ever asked about your faith and/or religious beliefs?		
Yes	27	21.1
No	101	78.9

may use other non-organizational resources, such as prayer or private religious activities. We believe this may be also the reason why we found no relationship between organizational religiousness and mental health.

In regard to quality of life, some studies have already found a relationship between R/S and wellness in vulnerable persons. Runquist and Reed (2007) investigated sheltered homeless persons and found correlations among spiritual perspective, self-transcendence, health status and well-being. Same results were found by Gill et al. (2010) who evaluated low-income rural women and found that spirituality and religiosity accounted for 39% of the variance in wellness. However, in the present study, we failed to replicate these findings. The possible explanation to support our results is that this is a young population (mean age of 36 years old). Therefore, some items of SF-12 could not represent well their physical or emotional functioning, since they are more prevalent in older persons. A previous study (Burdine et al. 2000) has already highlighted this problem using this scale.

Another important finding in this study was the participants' openness and positive opinions toward the relationship between spirituality and health. Most of them agreed that faith has an influence in health and in the onset of mental health problems, and said they would be comfortable and would like to have their faith addressed by a physician. These results are in line with a previous systematic review (Best et al. 2015), which showed that at least 70% of patients would welcome doctors to talk about spirituality.

Despite the high number of patients who want to talk about spirituality in a medical appointment, in our study, only 21% reported that a physician has ever asked about their faith. These results are also in accordance to previous studies, in which 10–32% of doctors ask their patients about R/S (Best et al. 2016; Lucchetti et al. 2011). These results underscore the gap between patients' expectations and the clinical practice.

Another interesting finding is that our participants believe that inquiring about R/S issues would strengthen patients' trust in their physician, which is similar to another study (Ehman et al. 1999). In the particular case of vulnerable populations, this finding could be very important for the treatment adherence and the healthcare success.

These results can help in the development of new preventive strategies for this population. Public health managers must improve the socioeconomic resources for this population (i.e., schools, health care) and create new leisure options and enhance the current ones (e.g., religious services). Likewise, health professionals working with vulnerable populations should recognize the role of religious and spiritual beliefs in patients' life and identify if this use is viewed as positive or negative to the patients.

Our study has some limitations. First, this is a cross-sectional study and cause–effect cannot be determined. Second, this is a specific vulnerable population in the Brazilian wetlands; caution should be made when generalizing to other wetlands worldwide, since we have different cultures and religious backgrounds. Third, the use of SF-12 as a quality of life measurement in this young population was probably not the best choice for the reasons listed above.

The present study found that spiritual and religious beliefs were associated with mental health, but not quality of life, in this Brazilian vulnerable population. Interestingly, participants have low levels of religious attendance and high levels of intrinsic/private religiousness and most of them said they would like to have their faith addressed by a health professional and that this approach would strengthen their trust on the doctors.

Compliance with Ethical Standards

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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