Saúde e Pesquisa, Maringá (PR)
DOI: 10.17765/2176-9206.2020v13n4p755-767

WORKING ABILITY IN WORKERS OF A RESEARCH INSTITUTE

Mariza Brasil de Carvalho

Master´s degree in Dentistry by UFPA/PA and Administration Analyst in Biomedical Research and Investigation at the Institute Evandro Chagas (IEC), Ananindeua (PA), Brazil.

Laura Soares Tupinambá

Master´s degree in Administration and Health Service by the Foundation Santa Casa de Misericórdia do Pará and Analysist at the Central Bank of Brazil (BC), Brazil.

Helder Henrique Costa Pinheiro

Doctoral degree in Tropical Diseases by UFPA/PA and Professor at the Institute for Health Sciences at the Federal University of Pará (UFPA), Pará, Brazil.

ABSTRACT: Current study assessed work ability (WA) and analyzed factors associated with inadequate capacity in employees of a research institute, according to their work contract. A cross-sectional study was conducted with 515 civil servants and outsourced employees of a research institution in the state of Pará, Brazil. A questionnaire with sociodemographic, functional variables and the Work Ability Index (WAI) was applied. Average WAI of the civil servant group was 40.9 and inadequate WA was 20.7%. Rates for outsourced workers were 44.3 and 5.1%, respectively. Multiple analysis of civil servants showed that only variables of gender and age remained significant. For the outsourced agents, no variable presented any statistical significance. The professional category with the highest prevalence of inadequate WAI were researchers, among civil servants; construction workers, among outsourced workers. Results show that the differences between these employees are strongly related to work contract.

KEY WORDS: Epidemiology; Occupational health; Occupational groups.

CAPACIDADE PARA O TRABALHO EM TRABALHADORES DE UM INSTITUTO DE PESQUISA

RESUMO: O estudo objetivou avaliar a capacidade para o trabalho (CT) e analisar os fatores associados à capacidade inadequada em funcionários de um instituto de pesquisa, segundo o vínculo empregatício. Realizou-se uma pesquisa transversal com 515 servidores e terceirizados de uma instituição de pesquisa no Estado do Pará. Utilizou-se um questionário com variáveis sociodemográficas, funcionais e o Índice de Capacidade para o Trabalho (ICT). A média do ICT do grupo dos servidores foi 40,9, e a CT inadequada somou 20,7%. Para os terceirizados, os valores foram 44,3 e 5,1%, respectivamente. A análise múltipla dos servidores mostrou que apenas as variáveis sexo e idade permaneceram significativas. Para os terceirizados, nenhuma variável apresentou significância estatística. As categorias profissionais com maior prevalência de ICT inadequado foram: entre os servidores, os pesquisadores; entre os terceirizados, os trabalhadores da manutenção. Os resultados demonstram que as diferenças existentes entre esses funcionários estão fortemente relacionadas ao vínculo empregatício.

PALAVRAS-CHAVE: Categorias de trabalhadores; Epidemiologia; Saúde do trabalhador.

Corresponding author:
Mariza Brasil de Carvalho
E-mail: marizabcarvalho@yahoo.com.br

Received in: 24/01/2020
Accepted on: 21/06/2020

INTRODUCTION

Working ability (WA) is a broad term that comprehends all skills required for the execution of a determined type of professional activity, including functional, physical, mental and social capacities. The degree by which WA corresponds to work demands may affect productivity, whilst the issues that the worker has to face may lead towards stress, diseases and inabilities related to work[1].

The aging of the population worldwide and, consequently, aging of workers and the need to extend their professional careers caused the development of valid rules for occupational health that would be able to evaluate the work capacity of employees and identify the activities required to prolong their work life[2]. In the 1980s, researchers of the Finnish Institute of Occupational Health (FIOH) developed the Work Ability Index (WAI). WAI is a tool to measure work ability from the worker´s perception. It is an aid to develop measures aimed at intervening, promoting and maintaining health, preventing WA losses and professional performance [3]. It is employed in workers´ health services in several countries.

Several conditions, such as life style, body mass index, intake of alcoholic beverages and the practice of physical activities, may influence the person´s work ability without being directly linked to work[3,4,5,6,7]. Aging also affects WA and may cause a decrease in productivity, especially due to occupations with high physical demand rates when compared to those with greater mental exigencies [4,7,8].

However, research on work ability generally focuses on specific professional categories without taking into account the work contract of these workers and if it interferes in their work ability. Further, systematic reviews in Brazil have revealed that the representation of all Brazilian workers has been jeopardized due to the lack of investigation on several professional categories with regard to their work ability, especially in the northern, northeastern and central-western regions [5,9].

On the other hand, the Brazilian labor market is characterized by high heterogeneity rates, in spite of its regulation by the State that establishes the bases for the protection of workers. Outsourcing is perceived as one of the most important landmarks in labor transformation experienced by Brazil during recent years, especially in public service. Several studies have shown the degradation to which these professionals have been submitted, such as lack of compliance with labor rights, bad working conditions, low salaries, poor health conditions, higher accident rates and others [10,11].

Owing to the importance of studies on WA in different occupational groups and types of employment, current research evaluates working ability and analyzes the factors associated with inadequate capacity in workers of a research institute in the state of Pará, Brazil, according to their labor contract.

METHODOLOGY

An observational and analytic study with a transversal design was performed at the Instituto Evandro Chagas (IEC), a department dependent on the Ministry of Health (MH) in the municipalities of Belém and Ananindeua PA Brazil. IEC develops research in Biological Science, Ecology and Tropical Medicine at national and international levels. The institution was chosen for current analysis since it harbors workers with many different occupations, permanent and outsourced employees, and thus favors an investigation of WA for different professional categories.

Studied population comprises IEC employees, divided into 475 civil servants of the institution and 245 outsourced employees, totaling 720 employees in April 2019. Civil servants comprise researchers, administration analysts, mid-level assistants and technicians, and helpers at basic level. Outsourced workers work at the departments of informatics, surveillance, transport, maintenance, general services and research assistants.

All civil servants and outsourced employees who accepted participating in current study were included. Exclusion criteria included workers on furlough, workers ceded to other institutions, in missions elsewhere, on sick leave or other types of absebce. Consequently, 48 workers were excluded due to criteria above and total participants were 672 workers who were divided into two groups: 442 IEC civil servants and 230 outsourced employees. Further, 528 participants answered the questionnaires, of which 13 were incomplete. Population analyzed was

finally composed of 515 participants, or rather, 76.6% of 672 workers: 338 civil servant of IEC and 177 outsourced employees.

Data were collected by questionnaire dealing with items on the social, demographic, functional and WAI, applied differently for the two employee groups. IEC civil servants filled the printed questionnaire on the spot, or filled the electronic one (Google Forms). An invitation was sent to the institutional e-mail to participate in the research, with guidelines on its aims. The civil servants accessed the questionnaire by first signing the Free Consent Term (FCT) and then, if accepted, answered the questions. In the case of outsourced employees, only the printed questionnaire was handed out, on the spot. The aims of the study, data privacy and voluntary participation were informed and participants´ FCT was provided. Data were collected between 10th October and 30th November 2018 and between 20th March and 30th April 2019.

Dependent variable comprised work ability measured by WAI, translated, adapted and validated for Brazil, widely employed in research works[6]. WAI evaluated the WA by a 10-question questionnaire (60 items) synthetized at seven dimensions. Results provided the degree of WA, varying between 7 and 49 scores. WAI scores were calculated on guidelines in the tool´s handbook[3].

Rates on adequate and inadequate ability were categorized according to criteria by Kujala et al.[12], by reference rates which were different for younger workers, so that WA overestimation would be avoided. In the case of people up to 34 years of age, WAI equal to or lower than 40 scores was the cross-section to define inadequate capacity, whilst index equal to or lower than 37 scores was employed for people over 35 years old. Score above these rates revealed adequate capacity [12].

Independent variables comprised social, demographical and functional aspects, such as gender, age (in four age groups), schooling, civil status, function, work contract (civil servant or outsourced employee) and service time at IEC. Descriptive analysis of variables was performed by calculating absolute frequencies and percentages, averages, standard deviation, minimum and maximum rates of score of the continuous variables to evaluate the profile of the population investigated.

Further, χ^2 was employed to verify the relationship between work ability with each independent variable per work contract. A multi-varied analysis was performed with Poisson´s regression with robust variation to investigate the association between WA and variables with $p<0.20$ in the uni-varied analysis for civil servants only. Prevalence Ratio (PR) controlled by possible confusion factors (adjusted PR) was calculated. In the case of outsourced employees, only age group showed $p<0.20$. Associations were significant at $p<0.05$. Data were processed in databases by Statistical Package for Social Sciences (SPSS) for Windows 20.0.

Current study complied with Resolution 466/12 of the Brazilian Health Council, approved by the Committee for Ethics in Research with Human Beings of the Instituto de Ciências da Saúde of the Universidade Federal do Pará (CEP-ICS/UFPA), protocol 2.903.874 and authorized by IEC director.

RESULTS

Table 1 shows the social, demographic and functional characteristics. Social and demographic variables and WAI revealed significant association ($p<0.05$) with employee contract.

Table 1. Characterization workers' IEC according to sociodemographic aspects and WAI, by work contract. Belém, 2019

Variable	Work contract						p
	Total		Civil servants		Outsourced em-ployees		
	n	%	n	%	n	%	
Gender							< 0,001
Female	243	47,2	196	58,0	47	26,5	
Male	272	52,8	142	42,0	130	73,5	
Civil status							< 0,001
Single/separeted/widowed	198	38,4	104	30,8	94	53,1	
Married/living with a partner	317	61,6	234	69,2	83	46,9	
Age							< 0,001
≤ 29 years old	33	6,4	11	3,2	22	12,4	
30 a 39 years old	182	35,4	126	37,3	56	31,6	
40 a 49 years old	149	28.9	80	23,7	69	39,0	
≥ 50 years	151	29,3	121	35,8	30	17,0	
Education							< 0,001
Basic school	38	7,4	1	0,3	37	20,9	
Higher school	120	23,3	21	6,2	99	55,9	
Higher education	164	31,8	135	39,9	29	16,4	
Postgraduate courses	193	37,5	181	53,6	12	6,8	
Service time at IEC							< 0,001
≤ 5 years	208	40,4	112	33,1	96	54,2	
6 a 14 years	168	32,6	103	30,5	65	36,7	
≥ 15 years	139	27,0	123	36,4	16	9,1	
Work Ability							< 0,001
Adequate	436	84,7	268	79,3	168	94,9	
Inadequate	79	15,3	70	20,7	9	5,1	
Function							< 0,001
Researcher	69	13,4	69	20,4	-	-	
Higher level analyst	29	5,6	29	8,6	-	-	
Mid-level assis-tants/technician	198	38,4	198	58,6	-	-	
Basic level assistant	42	8,2	42	12,4	-	-	
General service	78	15,1	-	-	78	44,1	
Surveillance	47	9,1	-	-	47	26,6	
Informatics	23	4,5	-	-	23	13,0	
Maintenance	15	2,9	-	-	15	8,5	
Driver	8	1,6	-	-	8	4,5	
Research assistants	6	1,2	-	-	6	3,4	

p: probability of the Chi-square test

Source: Elaborated by the authors.

Results showed that 58% of the civil servants are females, 69.2% are married and 93.5% have higher education or a higher degree. Mean age is 45.3±11.0 years old, ranging between 27 and 72 years old. Mean service time at the institution was 13.9±11.9 years, ranging between 1 and 46 years.

Further, 73.5% of outsourced employees were males; 53.1% were single and 76.8% has basic or high schooling. Mean age was 40.5±9.3 years old, minimum 22 years and maximum 65 years old. Service time ranged between 1 and 26 years, average 6.2±5.6 years.

Data analysis on their function at the institution showed that 58.6% of the civil servants were mid-level assistants or technicians; 20.4% were researchers; 12.4% performed basic level assistant duties; 8.6% were higher level analysts. Outsourced employees comprised general service (44.1%); surveillance (26.5%); informatics (13.0%), maintenance (8.5%), drivers (4.5%) and research assistants (3.4%).

Civil servants´ mean WAI score reached 40.9±5.1, with minimum rate at 20 and maximum at 49. After categorization by age, the group with inadequate ability reached 20.7%. WAI mean rate of outsourced employees was 44.3±3.8, with minimum at 29 and maximum at 49; only 5.1% revealed inadequate WA.

Table 2 demonstrates results of association analysis between adequate and inadequate WAI, sociodemographic and functional variables of the population studied according to work contract. Civil servants´ variables gender, age group and schooling showed $p<0.20$ and were included in multi-varied analysis by Poisson´s regression. No variable was statistically significant in outsourced employees.

Table 2. Association analysis between WAI, sociodemographic and functional characteristics, according to work contract, workers' IEC. Belém, 2019 (Continuation)

Variable	Work contract											
	Civil servants						Outsourced employees					
	Total	Adequate		Inadequate			Total	Adequate		Inadequate		
	n (338)	n	%	n	%	p	n (177)	n	%	n	%	p
Gender						0,001						0,212
Male	142	125	88,0	17	12,0		130	125	96,2	5	3,8	
Female	196	143	73,0	53	27,0		47	43	91,5	4	8,5	
Age						0,021						0,056
≤ 29 years old	11	5	45,5	6	54,5		22	21	95,5	1	4,5	
30 a 39 years old	126	99	78,6	27	21,4		56	50	89,3	6	10,7	
40 a 49 years old	80	62	77,5	18	22,5		69	69	100,0	0	0,0	
≤ 50 years	121	102	84,3	19	15,7		30	28	93,3	2	6,7	
Education						0,053						0,458
Basic/Higher school	22	21	95,5	1	4,5		136	130	95,6	6	4,4	
Higher education/ Pos-tgraduate courses	316	247	78,2	69	21,8		41	38	92,7	3	7,3	
Civil status						0,655						0,593
Sin-gle/separeted/widowed	104	84	80,8	20	19,2		94	90	95,7	4	4,3	
Married/living with a partner	234	184	78,6	50	21,4		83	78	94,0	5	6,0	
Service time at IEC						0,312						0,602
≤ 5 years	112	86	76,8	26	23,2		96	91	94,8	5	5,2	
6 a 14 years	103	79	76,7	24	23,3		65	61	93,8	4	6,2	
≥ 15 years	123	103	83,7	20	16,3		16	16	100,0	0	0,0	
Function						0,487						0,260
Researcher	69	53	76,8	16	23,2		-	-	-	-	-	

(Conclusion)

Variable	Work contract											
	Civil servants						Outsourced employees					
	Total	Adequate		Inadequate			Total	Adequate		Inadequate		
	n (338)	n	%	n	%	p	n (177)	n	%	n	%	p
Higher level analyst	29	25	86,2	4	13,8		-	-	-	-	-	
Mid-level assis-tants/technician	198	154	77,8	44	22,2		-	-	-	-	-	
Basic level assistant	42	36	85,7	6	14,3		-	-	-	-	-	
General service	-	-	-	-	-		78	72	92,3	6	7,7	
Surveillance	-	-	-	-	-		47	47	100,0	0	0,0	
Informatics	-	-	-	-	-		23	22	95,7	1	4,3	
Maintenance	-	-	-	-	-		15	13	86,7	2	13,3	
Driver	-	-	-	-	-		8	8	100,0	0	0,0	
Research assistants	-	-	-	-	-		6	6	100,0	0	0,0	

p: probability of the Chi-square test

Source: Elaborated by the authors.

Highest percentage inadequate WAI rate among civil servants was due to researchers (23.2%), followed by mid-level assistants and technicians (22.2%), basic level assistants (14.3%) and higher level analysts (13.8%). Among outsourced workers, maintenance workers had the highest percentages (13.3%). There was no inadequate WAI among surveillance workers, drivers and research assistants.

Results of adjusted multiple analysis for civil servants showed that gender and age remained significant variables. Females had a prevalence ratio of inadequate WA of 2.09 (confidence interval at 95%: between 1.26 and 3.45) when compared with males. Civil servants of age groups 30-39 years and 50 years or over had a 53 and 63% less prevalence ratio of inadequate ability when compared to those within the up-to-29 years group (Table 3).

Table 4 demonstrates responses of participants for WAI. Most attribute high scores for current work ability compared to the best throughout one´s life: 76.3% of outsourced workers and 68.6% of conferred scores 9 or 10. No worker attributed score zero.

Tabela 3. Modelo final de Regressão de Poisson das variáveis explicativas do ICT inadequado dos servidores do IEC. Belém, 2018

Variável	PRgross (95% CI)	p	RPadjusted* (95% CI)	p
Gender		< 0,001		0,004
Female	2,26 (1,37; 3,73)		2,09 (1,26; 3,45)	
Male	1		1	
Age				
≥ 50 years old	0,29 (0,15; 0,57)	< 0,001	0,37 (0,18; 0,78)	0,009
40 a 49 years old	0,41 (0,21; 0,81)	0,010	0,49 (0,23; 1,01)	0,054
30 a 39 years old	0,39 (0,21; 0,74)	0,004	0,47 (0,23; 0,94)	0,033
≤ 29 years old	1		1	
Education		0,110		0,178
Higher education/ Postgra-duate courses	4,80 (0,70; 32,97)		3,71 (0,55; 24,91)	
Basic/Higher school	1		1	

PRgross: prevalence ratio (PR) with unadjusted variables - bivariate analysis. **95% CI:** 95% confidence interval. **p:** probability of the Chi-s-quare test. **PRadjusted**: PR with variables adjusted to each other - multiple analysis

Source: Elaborated by the authors.

Tabela 4. Distribuição dos itens do ICT de acordo com o tipo de vínculo empregatício dos trabalhadores do IEC. Belém, 2019 (Continuation)

Item	Total		Civil servants		Outsourced employees		
	n	%	n	%	n	%	p*
Current work ability (CWA)							0,013
1 a 6	14	2,7	8	2,4	6	3,4	
7	33	6,4	26	7,7	7	4,0	
8	101	19,6	72	21,3	29	16,4	
9	158	30,7	112	33,1	46	26,0	
10	209	40,6	120	35,5	89	50,3	
CWA in relation to physical demands							0,228
Very good/good	413	80,2	266	78,7	147	83,0	
Moderate	84	16,3	57	16,9	27	15,3	
Poor/very poor	18	3,5	15	4,4	3	1,7	
CWA in relation to mental demands							0,236
Very good/good	480	93,2	316	93,5	164	92,7	
Moderate	31	6,0	18	5,3	13	7,3	
Poor/very poor	4	0,8	4	1,2	0	0,0	
Number of diagnosed diseases							<0,001
0	222	43,1	97	28,7	125	70,6	
1	86	16,7	60	17,7	26	14,7	
2	94	18,3	77	22,8	17	9,6	
3	39	7,6	35	10,4	4	2,3	
4	22	4,3	20	5,9	2	1,1	
5 ou mais	52	10,1	49	14,5	3	1,7	
Estimation of work impairment due to disease							<0,001
There is no impediment / I have no disease	292	56,7	150	44,4	142	80,2	
I am able, but with symptoms	133	25,8	110	32,5	23	13,0	
Sometimes I need to slow down my work	74	14,4	66	19,5	8	4,5	
I often need to slow down my work pace	8	1,6	6	1,8	2	1,1	
I am able to work part time	5	1,0	5	1,5	0	0,0	
I am totally unable to work	3	0,6	1	0,3	2	1,1	
Sickness absence during past 12 months							<0,001
None	229	44,5	91	26,9	138	78,0	
≤ 9 days	195	37,9	166	49,1	29	16,4	
10 a 24 days	61	11,8	54	16,0	7	4,0	
25 a 99 days	20	3,9	18	5,3	2	1,1	
100 a 365 days	10	1,9	9	2,7	1	0,6	
Own prognosis of work ability							0,008
Unlikely	33	6,4	14	4,1	19	10,7	
Not quite right	44	8,5	33	9,8	11	6,2	
Quite likely	438	85,1	291	86,1	147	83,1	
Appreciation of daily activities							0,006
Always/almost Always	461	89,5	292	86,4	169	95,5	
Sometimes	47	9,1	40	11,8	7	3,9	
Rarely/never	7	1,4	6	1,8	1	0,6	

(Conclusion)

Item	Total		Civil servants		Outsourced employees		
	n	%	n	%	n	%	p*
Feeling active and alert							0,022
Always/almost Always	453	88,0	291	86,1	162	91,5	
Sometimes	50	9,7	41	12,1	9	5,1	
Rarely/never	12	2,3	6	1,8	6	3,4	
Sense of hope for the future							<0,001
Continuously/almost Always	440	85,4	273	80,8	167	94,3	
Sometimes	57	11,1	48	14,2	9	5,1	
Rarely/never	18	3,5	17	5,0	1	0,6	

p: probability of the Chi-square test.

Moreover, 83.0% of outsourced workers and 78.7% civil servants estimated very good or good current work ability within physical requirements; in the case of mental requirements, percentages reached 92.7% and 93.5%, respectively. It should be underscored that no outsourced worker considered this factor low or very low.

Further, 70.6% of outsourced workers replied they neither had any diagnosed disease nor suffered lesions by accidents, whilst only 28.7% of civil servants said the same. On the other hand, 14.5% of civil servants and only 1.7% of outsourced workers declared they had some type of disease or suffered from five or more lesions.

Civil servants replied that the most prevalent diseases were gastritis (21.9%), arterial hypertension (15.7%) and lesion on the back (15.4%). The main diseases cited by outsourced workers were gastritis (9.6%), arterial hypertension (5.6%) and muscle-skeleton diseases on the arms and legs (4.5%).

Table 4 reveals significant differences between types of workers since 80.2% of outsourced workers said they did not have any disease or impairments for works and only 5.6% admitted that they had to decrease work rhythm frequently or sometimes, due to lesions or diseases. Answers by civil servants were 44.4 and 21.3%, respectively.

In the case of sick leave during the last 12 months, 78% of outsourced workers stated that they never missed work a single day, whilst 16.4% declared they were absent from work up to nine days. However, results for civil servants reached 26.9% and 49.1%, in this order. In spite of the above, 10.7% of outsourced employees and 4.1% of civil servants stated that, due to health, it would not be able to do current work in two years.

All items were statistically significant with regard to type of work contract, except current work capacity with regard to physical and mental requirements.

DISCUSSION

The socio-demographic and functional characteristics of IEC workers in current study and their inadequate ability for work were statistically significant with regard to type of labor and revealed that differences between people are strongly related to the work contract. It is greatly interesting to note that females were predominant (58%) among IEC civil servants, although males were predominant (73.5%) among outsourced employees. This is perhaps due to their specific occupations, especially the latter, predominantly masculine, such as maintenance, informatics, surveillance, driving and general services personnel. Results corroborate a study undertaken in a government-run university in northeastern Brazil where 52.4% of outsourced workers were male (depending on occupation), especially surveillance personnel, with 83% [11].

Most civil servants (93.5%) have higher education and even postgraduate courses, whilst most of outsourced employees (76.8%) had only basic and high schooling. The difference is due to the fact that IEC is a research institute and employees have a career scale which stimulates civil servants to improve their educational conditions to increase their earnings. This fact does not to

outsourced employees. Druck et al.[11] showed even more significant percentages in their research since almost all outsourced employees (97.1%) had basic or high schooling.

Average service time in the institution reached 13.9 years and, in the case of outsourced workers, 6.2 years. Different results in service time in IEC may be due to greater turnover of outsourced employees. This fact does not occur with civil servants who have stability status in their employment. Previous researches have reached the same conclusions, or rather, outsourced employees have a less time service in their firms [11,13].

Results also demonstrated that average score of work ability was higher among outsourced employees (44.3), whilst the prevalence of inadequate capacity was lower (5.1%). The opposite occurred with civil servants, or rather, mean score reached 40.9 and prevalence reached 20.7%. However, WA is greatly related to the workers´ type of work contract. Several authors agree that WA is a dynamic process which is the product of the interaction of several individual and labor factors [2,4,5,6,7,8].

Similar results have been reached by Rotenberg et al.[13] who investigated the link between night work shift and WAI and whether work contract affect the relationship. The authors concluded that temporary or outsourced workers had a higher WAI average and a significantly lower percentage of workers with insufficient WA when compared to those with more stable employment. A research on factors associated with WA for basic care nurses in the state of Bahia also showed that WAI is associated with employment type since the prevalence of inadequate WA was higher among workers with fixed employment that with those with temporary employment [14]. Another study with hospital employees in Rio de Janeiro (RJ) also results in high WAI rates in temporary workers [15], and thus corroborated results of current research.

IEC employees´ function provided unexpected results due to high inadequate WA percentages (23.2%) and the lowest for outsourced employees. However, inadequate WAI was inexistent in surveillance, drivers and research assistants.

The above do not comply with previous studies which concluded that employees with greater mental demands had higher WA levels than those with greater physical demands. This was perhaps due to weariness and health impairment hailing from professions that demand greater physical effort are more intense than those demanding intellectual activity [8,16].

However, a study with a broader group of employees of several professions in Poland revealed a robust relationship between WA and the profession´s demand and the type of activity. Highest WAI rates occurred among education, science and business workers, whereas civil servants and health workers had the lowest rates, in whom WA may be subjected to a more accelerated deterioration[17].

On the other hand, a survey on higher education professors showed that demands on these professionals resulted in unsustainable intensification of activities and tasks with lack of time for more basic human activities and on chronic weariness of intellectual workers due to excess of labor. The above directly impacts their personal, family and social life with repercussions on their physical and mental health[18].

These are probably the motives of more frequent inadequate ability among IEC researchers, many of whom accumulate tasks as teachers, with increasing work load and daily responsibilities, causing stress and, consequently, decrease in WA.

Several studies have revealed a relationship between stress and WA. Martinez et al.[19] showed that high levels of exposure to stress factors in a working milieu were associated with a decrease in WA in hospital employees. Godinho et al.[20] associated WA with disease, stressing factors in the work environment, low social support, contact with clients and type of function.

A research with employees from various departments in Iran which investigated work-related stress effect and WA showed a significant co-relationship between stress and WAI [21]. Another research with resident physicians in German hospitals demonstrated that occupation stress is a risk factor for depression symptoms and may affect mental health and WA[22]. Stress was inversely associated with WA in Chinese workers and relationship was mediated by health[23].

However, one should note the high adequate WA percentages in outsourced employees of IEC (94.9%). Research with employees with high physical demands reached different rates than those in current study:

89% in a clothes industry in Divinópolis (MG)[16]; 80% among guards in a university in Juiz de Fora (MG)[24]; 85.8% of employees from physically-demanding different professions in Australia[25]; 70.9% of employees in food industries in Iran[26].

High WAIs of outsourced employees in current research may be related to age since only 16.9% are more than 50 years old. The above agrees with analysis of several research works that evidenced aging process as one of the main factors that affected WA[3,7,8,20].

However, other factors should be taken into account, among which the type of questionnaire may be mentioned. Questionnaire filled by the employees themselves are subjected to information given by the participant and may be affected by several factors, such as memory, comprehension capacity and a socially desirable report [20].

Moreover, workers that negatively evaluate their health may decide not to participate in the research or give incorrect responses fearing exposure and, mainly, loss of job[8]. This occurs mainly among outsourced employees due the type of work contract with no stability. Or rather, different from civil servants, with a different work contract. Further, employees may avoid having sick leave, even if required, since their salary will be less at the end of the month.

Moreover, one should also take into account the effect of the healthy employee which consists in the admission of healthier ones, whilst people with health problems are discarded[27]. The situation is more common in private enterprises (as in the case of outsourced employees) with more strict selection, when compared to contracts by public institutions where civil servants are admitted by public examination.

The relationship between WAI and socio-demographic variables of employee groups showed that, only in the case of civil servants, inadequate capacity for work remained associated with gender and age. No association was extant for outsourced groups. Females had an inadequate WA prevalence ratio twice that of males; employees within the 30 – 39 years old group and those over 50 years old had a prevalence ratio of inadequate capacity, respectively with 53% and 63% less when compared to those under 29 years old.

Previous studies concluded that females were associated with lower WAI scores when compared to males. Several researches concluded that females are associated with lower WAI scores due to accumulation of professional work and domestic tasks, besides children´s care. Overload leads towards physical and mental stress affecting health, life quality and, consequently, WA [20,26,28].

Results referring to employees´ age showed an expected inverse association with WA, since younger workers, up to 29 years old, had a greater prevalence of inadequate WA when compared to older ones. The above may be due to reduced percentage of civil servants in this age group (3.3%), which may lead to statistical errors and may be a limitation for current research.

In the case of items of the WAI questionnaire, only the current WA with regard to physical and mental demands failed to show statistical significance when related to type of employment, which reinforces the great influence that the work contract has on WA.

When present WA is compared to the best throughout life, the outsourced group revealed higher percentages in the two higher scores than those of civil servants, namely 76.3% and 68.6% respectively. Gracino et al.[29] evaluated WA in physician in Maringá PR Brazil, and obtained similar rates to those of civil servants in current research (65%). Result reached 44.3% in research by Silva et al.[28] who examined dentists in primary health care in Teresina PI Brazil.

In the case of present ability with regard to physical and mental demands, rates were similar for the two employee groups: most considered it very good and good for several types of professions. In spite of this, more than 90% in the two groups evaluated their WA as very good, especially with regard to mental demands.

Research with physicians with more mental activities had similar conclusions[29], but a study with Iranian firemen had mean results with regard to mental and physical requirements, namely 55.9% and 54.7%, respectively[30].

There was a significant difference in responses of current study on the number of lesions by accident or diagnosed diseases. Most outsourced employees reported no lesions or diseases (70.6%), whilst only 28.7% of civil

servants said the same. The above may be related with the effect of the healthy employee already mentioned.

Most referred diseases by the two employee groups were gastritis and arterial hypertension, followed by lesions on the back (civil servants) and muscular-skeleton diseases on the arms and legs (outsourced employees). A study with different professional categories in Poland reported muscle-skeletal diseases as the main health issue[17].

Another greatly important item in current study refers to the fact that most outsourced employees declared no diseases or work impairments (80.2%), with no absences from work (78%), whereas responses by civil servants were 44.4% and 26.9%, respectively. Data may be related to the healthy employees´ effect or to a greater difficulty of outsourced employees to miss a day´s work. A study by Rotenberg et al.[13] showed less propensity for many absent days due to disease by employees with precarious jobs when compared to more stable one.

Several authors have insisted that maintenance and promotion of WA during professional life do not depend only on employees. Employers and policy administrators should enhance adjustments in work demands, favor professional development, improve work and social environment and undertake health and prevention activities. Consequently, an epidemiological monitoring of employees´ physical and mental health is required to prevent early loss of WA of these people [2,3,15].

The implementation of strategies and activities in employees´ health is thus necessary to improve WA of the institution´s workers, especially civil servants. In fact, a significant section showed inadequate ability for work. Further, a follow-up is also required to maintain adequate WA through the whole professional life.

Current study differs from others since the population by the various professional groups of the institution, civil servants and outsourced employees. Previous researches were based on samples with people of the same profession. Current study, therefore, compared WAI results for the different categories of employees and demonstrated the distinctions between them and contributed towards a relevant theme in the field of employees´ health.

The employment of a validated and widely used questionnaire may be also an advantage in current study, minimizing possible corrections. Care was also taken to instruct in details the participants as to the filling of the form.

Research´s transversal design may have been a limiting factor since it fails to make any relationship between cause and effect. It merely provides the evaluation of events on the spot. Further, the planning of current study excluded employees on sick leave or other types of absence which may have affected the results. Another possible limitation is the effect of the healthy employee, greatly common in investigations involving workers. The importance of current research does not merely lay in its originality of the WAI in the Amazon region, with few studies on the subject, but particularly with the results.

CONCLUSION

Results showed that labor contract affects WA. However, in contrast to what has been expected, prevalence of inadequate capacity for work was greater among civil servants than among outsourced employees. Further, employees with high mental demands, especially researchers, showed predominance of inadequate WA than those with mere physical demands.

REFERENCES

1. World Health Organization. Aging and working capacity: report of a WHO Study Group. WHO Technical Reports Series. Geneva: 1993.

2. Ilmarinen J, Von Bonsdorff M. Work Ability. The Encyclopedia of Adulthood and Aging. Edited by Susan Krauss Whitbourne; 2015.

3. Tuomi K, Ilmarine JE, Jahkola A, Katajarinne L, Tulkki A. Índice de Capacidade para o Trabalho. Tradução de Frida Marina Fischer (coord.). 2a ed. São Carlos: UFSCar; 2010.

4. Fischer FM, Borges FNS, Rotenberg L, Latorre MRDO, Soares NS, Rosa PLFS et al. Work ability of

health care shift workers: what matters? Chronobiology International. 2006; 23(6):1165-79.

5. Cordeiro TMSC, Araújo TM. Capacidade para o trabalho entre trabalhadores do Brasil. Rev Bras Med Trab. 2016; 14(3):262-74.

6. Martinez MC, Latorre MRDO, Fischer FM. Validity and reliability of the Brazilian version of the work ability index questionnaire. Rev Saúde Pública. 2009; 43(3):525-32.

7. Garzaro G, Sottimano I, Di Maso M, Bergamaschi B, Coggiola M, Converso D et al. Work Ability among Italian Bank Video Display Terminal Operators: Socio-Demographic, Lifestyle, and Occupational Correlates. Int. J. Environ. Res. Public Health. 2019; 16:1653.

8. El Fassi M, Bocquet V, Majery N, Lair M, Coufgnal S, Mairiaux P. Work ability assessment in a worker population: comparison and determinants of work ability index and work ability score. BMC Public Health. 2013; 13:1-10.

9. Godinho MR, Ferreira AP, Fayer VA, Bonfatti RJ, Greco RM. Capacidade para o trabalho e fatores associados em profissionais no Brasil. Rev Bras Med Trab. 2017; 15(1):88-100.

10. Pelatieri P, Marcolino A, Horie L, Costa LAR, Camargos RC. As desigualdades entre trabalhadores terceirizados e diretamente contratados: análise a partir dos resultados de negociações coletivas de categorias selecionadas. In: Campos AG, organizador. Terceirização do trabalho no Brasil: novas e distintas perspectivas para o debate. Brasília: Ipea; 2018, 34-48.

11. Druck G, Sena J, Pinto MM, Araújo S. A terceirização no serviço público: particularidades e implicações. In: Campos AG, organizador. Terceirização do trabalho no Brasil: novas e distintas perspectivas para o debate. Brasília: Ipea; 2018, 113-141.

12. Kujala V, Remes J, Ek E, Tammelin T, Laitinen J. Classification of Work Ability Index among young employees. Occup Med. 2005; 55:399-401.

13. Rotenberg L, Griep RH, Fischer FM, Fonseca MJM, Landsbergis P. Working at night and work ability among nursing personnel: when precarious employment makes the difference. Int Arch Occup Environ Health. 2009; 82:877-85.

14. Cordeiro TMSC, Araújo TM. Capacidade para o trabalho entre trabalhadores de enfermagem da atenção básica à saúde. Bahia, Brasil. Rev. Salud Pública. 2018; 20(4):422-29.

15. 15. Moreira PSV, Silvino ZR, Cortez EA. Saúde do trabalhador: atenção subsidiada pelo índice de capacidade para o trabalho. Rev enferm UFPE [online]. 2016 [acesso em 2019 Nov 15]; 10(1):18-23. Available at https://periodicos.ufpe.br/revistas/revistaenfermagem/article/download/10916/12194.

16. Augusto VG, Sampaio RF, Ferreira FR, Kirkwood RN, César CC. Factors associated with inadequate work ability among women in the clothing industry. Work. 2015; 50:275-83.

17. Juszczyk G, Czerw AI, Religioni U, Olejniczak D, Walusiak-Skorupa J, Banas T et al. Work Ability Index (WAI) values in a sample of the working population in Poland. Ann Agric Environ Med. 2019; 26(1):78-84.

18. Viana CMQQ, Machado LC. Desenvolvimento profissional docente e intensificação do trabalho: viver ou sobreviver? Em Aberto. 2016; 29(97):47-60.

19. Martinez MC, Latorre MRDO, Fischer FM. Estressores afetando a capacidade para o trabalho em diferentes grupos etários na Enfermagem: seguimento de 2 anos. Ciênc Saúde Coletiva. 2017; 22(5):1589-1600.

20. Godinho MR, Greco RM, Teixeira MTB, Teixeira LR, Guerra MR, Chaoubah A. Work ability and associated factors of Brazilian technical-administrative workers in education. BMC Res Notes. 2016; 9:1.

21. Gharibi V, Mokarami H, Taban A, Aval MY, Samimi K, Salesi M. Effects of Work-Related Stress on Work Ability Index among Iranian Workers. Saf Health at Work. 2016; 7:43-48.

22. Bernburg M, Vitzthum K, Groneberg DA, Mache S. Physicians' occupational stress, depressive symptoms and work ability in relation to their working environment: a cross-sectional study of differences among medical residents with various specialties

working in German hospitals. BMJ Open. 2016 ; 6. Available at : https://bmjopen.bmj.com/content/6/6/e011369 on 15/11/2019.

23. Yang T, Liu T, Lei R, Deng J, Xu G. Effect of Stress on the Work Ability of Aging American Workers: Mediating Effects of Health. Int. J. Environ. Res. Public Health. 2019; 16:2273.

24. Godinho MR, Ferreira AP, Greco RM, Teixeira LR, Teixeira MTB. Work ability and health of security guards at a public University: a cross-sectional study. Rev. Latino-Am. Enfermagem. 2016 ; 24:e2725. Available at : http://dx.doi.org/10.1590/1518-8345.0616.2725. Om 20;11/2019.

25. Rothmore P, Gray J. Using the Work Ability Index. Work. 2019; 62:251-259.

26. Tavakoli-Fard N, Mortazavi SA, Kuhpayehzadeh J, Nojomi M. Quality of life and work ability of women workers. IJOMEH. 2016; 29(1):77-84.

27. Werneck GL, Almeida LM. Validade em Estudos Epidemiológicos. In: Medronho, RA, Bloch KV, Luiz RR, Werneck GL. Epidemiologia. 2a ed. São Paulo: Editora Atheneu; 2009.

28. Silva JMN, Moura LFAD. Capacidade para o trabalho de cirurgiões-dentistas da atenção básica: prevalência e fatores associados. Rev Bras Saúde Ocup 2016; 41:e25. Available at : http://www.scielo.br/pdf/rbso/v41/2317-6369-rbso-41-e25.pdf. em 20//11/2019.

29. Gracino ME, Tortajada JS, Castro-Alves MB, Garcia SF, Yamaguchi MU, Massuda EM. Análise da capacidade dos médicos para o trabalho, na cidade de Maringá. Rev Bras Med Trab. 2018; 16(4):417-28.

30. Firoozeh M, Saremi M, Kavousi A, Maleki A. Demographic and occupational determinants of the work ability of firemen. J Occup Health. 2017; 59:81-87.