Prevalence and Correlates of Depression among Resident Physicians in Alberta, Canada

Folajinmi Oluwasina[1 2] MPH PhD, Reham Shalaby[2] MD PhD, Ejemai Eboreime[3] MD PhD, Izu Nwachukwu[4] MD MSc FRCPC, Adam Abba-Aji[2] MD MSc FRCPC, Marianne Hrabok[5] MD MSc PhD, Belinda Agyapong[2] BSc MEd, Daniel Li[2] MD, Adegboyega Sapara[2] MD PhD FRCPC, Vincent I.O. Agyapong[2 3] MD PhD FRCPC

Corresponding author: Dr Vincent I.O. Agyapong.
Email: agyapong@ualberta.ca

[1] Department of Biological Science, Red Deer Polytechnic, Red Deer, Canada
[2] Department of Psychiatry, University of Alberta, Edmonton, Canada
[3] Department of Psychiatry, Dalhousie University, Halifax, Canada
[4] Department of Psychiatry, University of Calgary, Calgary, Canada
[5] Department of Psychiatry, University of British Columbia, Victoria Island, Canada

ABSTRACT

Background

Depression has emerged as a priority mental health issue among medical professionals. Depression among physicians has been associated with poor patient care, an increase in medical errors, and issues with coping in a multi-professional team environment.
This study assessed the prevalence and correlation of depression among resident physicians in Alberta, Canada.

Methods

A descriptive cross-sectional study design was used. Questionnaires were self-administered through an anonymous online survey. Data collected included socio-demographics, professional satisfaction, and workplace collegiality-related variables. The Patient Health Questionnaire (PHQ-9) screening instrument was used to identify depressive symptoms. A cut-off score of ≥ 10 was used to determine the presence of likely Major Depressive Disorder (MDD). Data were analyzed using descriptive statistics, the Chi-square test, and logistic regression at $p \leq 0.05$.

Results

Of the 157 resident physicians who completed the survey, 59.3% (83) were less than 30 years, while 40.7% (57) were above 30 years. The majority, 60.7% (85) , were female. The prevalence of likely MDD was 28.5% in our study. Resident physicians who neither agreed nor disagreed that they were satisfied with their career in medicine were 20 times more likely to have MDD compared with those who agreed that they were satisfied with their career in medicine (OR=20.050; 95% CI: 3.963 – 101.446). In addition, resident physicians who work more than 80 hours per week were about nine times more likely to have MDD than those who work less than 80 hours per week (OR=8.720; 95% CI: 1.579 – 48.164).

Conclusion

There was a high prevalence of likely MDD among resident physicians in Alberta, and resident physicians who were ambivalent about their careers in medicine were particularly prone to experiencing depression compared to those who were satisfied with their careers in medicine. Interventions to prevent and reduce the incidence of depression among resident physicians in Alberta are recommended.

Keywords: Burnout, Depression, Mental Health, Resident doctors, Job satisfaction

Introduction

Depression is a common and serious medical illness that negatively affects how people feel, act, and think. It can be conceptualized as a psychological syndrome arising from a continued response to chronic interpersonal stressors while at work [1]. Physicians experience various challenges during their medical school years and residency training [2]. Depression amongst resident physicians has been linked to poor patient care and an increase in medical errors [3], uncertainty in management, and coping difficulties in unfamiliar multi-professional team environments [4]. These rigors of residency training may negatively affect young physicians, resulting in depression [5] or decreased performance [6]. In a study conducted by Ferrari et al. in 2013, physicians have an increased risk of depressive symptoms when compared to the general population [7]. One notable consequence of depression is the high prevalence of suicides among physicians, with an aggregate suicide rate ratio of 1:41 for male and 2:27 for female physicians, compared to the general population [8]. Both social and personality factors influence depressive symptoms in physicians. Apart from these social and personality factors, work-related factors are also associated with depression among physicians [9].

Depression has emerged as a priority mental health issue among medical professionals, with increasing evidence showing the next generations of medical health professionals suffering from alarming rates of both burnout and depression. According to several studies, resident physicians have higher rates of depression than the general population, and this trend is carried past graduation and into the workforce [10, 11]. In a systematic review study conducted by Mata et al, there was an overall prevalence of depression and depressive symptoms of 28.8% in the medical workforce (ranging from 20.9% to 43.2%), underlining the importance of depression at all points in the medical career [12]. For a variety of reasons, physicians and resident physicians suffering from depression or burnout can be slow to seek help [13].

The high prevalence of depression among physicians and trainees may also have essential effects on patients. For example, several studies have found that resident physicians who screened positive for depression or burnout were more likely to report making errors [14,15,16,17].

Residency training is a critical and transitional phase in the education of doctors. Even in the best of circumstances, it can be considered a complex and exhausting period full of pressures such as work overload and sleep deprivation, patient responsibility, fear of making mistakes, lack of time to study, having to prepare for exams, reduced sense of autonomy, and inadequate support from supervisors [18]. It follows, therefore, that this period can be considered the most probable period for developing burnout syndrome [19].

The role of frontline workers, including resident physicians, is very critical to health and wellness at society level, and attending to their mental well-being is important to meeting these needs. According to a study [20], depression contributes to career dissatisfaction in resident physicians.

In this study, we examined the prevalence and correlates of likely Major Depressive Disorder (MDD) among resident physicians in Alberta, Canada.

Methods

Study Setting and Design

This study was conducted in Alberta, a western province of Canada, with a population of 4,286,134 in 2017[21]. From a healthcare perspective, Alberta is divided into five administrative health regions: Edmonton, Calgary, Southern, Northern, and Central. Health care is administered mainly through Alberta Health Services and Primary Care Networks. As of December 2018, there were 1594 resident physicians registered with the College of Physicians and Surgeons of Alberta, Canada [22]. This descriptive cross-sectional study was designed through self-administered, anonymous, online questionnaires. At the time of this study, the total resident physician population in Alberta was 1594, and an anticipated sample size of 959 was determined based upon a 95% confidence level and a margin of error of 2% for prevalence rate estimates for resident physicians' depression.

Institutional Review Board approval

The study followed the Declaration of Helsinki (Hong Kong Amendment) and Good Clinical Practice (Canadian Guidelines). All participants were provided with an online information leaflet; informed consent was implied if respondents completed and submitted the online questionnaires. The study received ethical approval from the Health Ethics Research Board of the University of Alberta (reference number Pro00091436) and the Conjoint Health Research Ethics Board of the University of Calgary (REB19-1457).

Data Collection Tool

Data collection tools for this study were developed based on published literature and questions from previously

validated instruments. Data collection tools were sent through Alberta Health Services to the participants and were collected between 2021 and 2022. Depression symptoms were measured using the Patient Health Questionnaire-9 (PHQ-9) [23]. The psychometric properties of the PHQ-9 have been evaluated with various populations, including medical personnel, psychiatric patients' specific groups of medical patients, and the general population.

The PHQ-9 consists of a 9-item validated instrument (associated with a Cronbach's alpha of 0.89) on a four-point Likert scale, which is used to diagnose and measure the severity of depression in general medical and mental health settings. Each of the nine questionnaire items is scored between 0 (not at all) and 3 (nearly every day), yielding a total score ranging from 0 to 27, with a higher score indicating more severe depressive symptoms. [24]. The PHQ-9 demonstrated good convergent validity with related constructs with adequate internal consistency [25]. PHQ-9 score ≥10 had a sensitivity of 88% and a specificity of 88% for major depression [23].

Statistical analysis

Data were analyzed using SPSS (Version 26; IBM Corp) [26]. The descriptive data were presented as frequency and percentages according to the respondents' responses to all the demographic and clinical variables. We used univariate analyses with a chi-squared test to ascertain the relationship between each of the variables and the likelihood of MDD among respondents. The cut-off score for likely MDD was ≥10. Only completed responses were reported, with no data imputation. Chi-square test/Fisher's exact analysis with two-tailed significance (P≤0.05) was performed to assess the association between the demographic and academic variables of the residents, and the likelihood of MDD was measured using the PHQ-9. Variables with statistically significant or near significant association ($p \leq 0.1$) for each variable were entered into separate logistic regression models. Before performing the binary logistic regression analysis, correlational diagnostics were performed to identify any strong inter-correlations (Spearman's correlation coefficient of 0.7 to 1.0 or −0.7 to −1.0) among predictor variables. Logistic regression analysis was employed to identify significant predictors of likely MDD. Odds ratios from the binary logistic regression analysis were reported to determine the association between the predictor variables and likely MDD.

Results

Out of the 1594 resident physicians reached in Alberta with the survey link, 157 responses were received, 17 were blank, and 140 resident physicians contained fully completed responses, which were included in the analysis. Only partially and fully completed responses were included in the analysis.

Table 1a below illustrates the distribution of the sociodemographic information as well as the academic background of the respondents.

Of the resident physicians who participated in the survey, 59.3% (83) were less than 30 years old, while 40.7% (57) were above 30 years of age. The majority, 60.7% (85), were females, and 39.3% (55) were males. The majority, 72% (113) of the resident physicians do not have dependents, while a small proportion, 28% (44), have children. 77.9% (109) of the respondents were in a relationship, while 22.1% (31) were not in a relationship.

This study showed that the predominant ethnicity of the respondents was Caucasian, 65.7% (92), while other ethnicities constitute 34.3% (48) of the total participants. At the time of this study, 52.1% (73) of the resident physicians owed $100,000 or less, while 47.9% (67) owed more than $100,000.

Overall, 25.7% (36), 24.3% (34), 13.6% (19), and 19.3% (27) were in their first, second, third, and fourth-year postgraduate years, respectively. A few, 10% (14) and 7.1% (10), were in their fifth and sixth-year postgraduate years.

Seventy-four percent (104) of the respondents reported they worked less than 80 hours per week, while 25.7% (53) worked above 80 hours per week. A similar proportion (23.6% (33)) of the residents' physicians were part of either the family medicine or the internal medicine residency programs. 18.6% (26) were part of the surgical specialties' residency program, 10% (14) were part of the psychiatry residency program, and other residency programs constituted 24.3% (34).

Table 1a: Sociodemographic characteristics of the respondents		
Variable type	Variable	Frequency (%)
Age (years)	≤30	83 (59.3)
	>30	57 (40.7)
Gender	Male	55 (39.3)
	Female	85 (60.7)
Dependents	No	113 (72.0)
	Yes	44 (28.0)
Relationship Status	In a relationship	109 (77.9)
	Not in a Relationship	31 (22.1)
Ethnicity	Caucasian	92 (65.7)
	Others	48 (34.3)
How much debt do you currently have	≤$100,000	73 (52.1)
	>$100,000	67 (47.9)
Year of residency training	PGY-1	36 (25.7)
	PGY-2	34 (24.3)
	PGY-3	19 (13.6)
	PGY-4	27 (19.3)
	PGY-5	14 (10.0)
	PGY-6	10 (7.1)
How many hours do you work per week	≤80 hours	104 (74.3)
	>80 hours	53 (25.7)
What residency program are you part of	Surgical Specialties	26 (18.6)
	Family Medicine	33 (23.6)
	Internal Medicine	33 (23.6)
	Psychiatry	14 (10.0)
	Others	34 (24.3)

Table 1b shows the summary statistics of professional satisfaction, workplace collegiality, and support. Most 75.9% (101) were satisfied with the quality of peer collaboration with their colleagues. Respondents reported that they were satisfied 76.7% (102) with the quality of interaction with physicians and residents, while 10.5% (14) were dissatisfied.

The majority, 69.2% (92) of the respondents, were satisfied with their professional relationships with their colleagues, while 45.1% (60) were satisfied with their workload and job demand. Most, 53.4% (71) of the resident physicians were dissatisfied with control and flexibility, and work-life integration was 42.9% (57). 38% (51) were neither satisfied nor dissatisfied with the efficiency and resources available to them.

Sixty-two percent (80) expressed satisfaction with their career in medicine. The majority, 83% (108), reported that they find their colleagues very supportive, while a very few, 3.1% (4), expressed that their colleagues were not supportive. Most, 78.3% (101) of respondents believed that people treat each other with respect, and 8.5% (11) disagreed that people do not treat each other with respect. Similarly, 78.3% (101) majority agreed that the spirit of cooperation and teamwork exists in their work group, while 9.3(12) disagreed that the spirit of cooperation and teamwork exists in their work group. Sixty-four percent (82) believed that disputes or conflicts are resolved fairly in their work group, while a small portion, 13.2% (17), disagreed that disputes or conflicts are resolved fairly in their work group. Most, 87.5% (105) of the respondents feel well-supported when they reach out to their friends and family. The majority, 78.3% (94), agreed that their colleagues were somewhat supportive when they reached out for help from those in their learning and work environment.

Table 1b: Professional Satisfaction and Workplace Collegiality and Supports Available to Respondents

Variable	Satisfied N (%)	Neither satisfied/dissatisfied N (%)	Dissatisfied N (%)
Quality of peer collaboration among residents	101 (75.9)	18 (13.5)	14 (10.5)
Quality of interaction with physicians and residents	102 (76.7)	17 (12.8)	14 (10.5)
Quality of learning environment	92 (69.2)	23 (17.3)	18 (13.5)
Workload and job demand	60 (45.1)	30 (22.6)	43 (32.3)
Control and flexibility	35 (26.3)	27 (20.3)	71 (53.4)
Work-life integration	40 (30.1)	36 (27.1)	57 (42.9)
Efficiency & resources	47 (35.3)	51 (38.3)	35 (26.3)

Variable	Agree N (%)	Neither Agree nor Disagree N (%)	Disagree N (%)
Overall, I am satisfied with my career in medicine	80 (62.0)	31 (24.0)	18 (14.0)
I find colleagues to be supportive	108 (83.7)	17 (13.2)	4 (3.1)
People treat each other with respect in my work group	101 (78.3)	17 (13.2)	11 (8.5)
A spirit of cooperation & teamwork exists in my group	101 (78.3)	16 (12.4)	12 (9.3)
Disputes or conflicts are resolved fairly in my workgroups	82 (63.6)	30 (23.3)	17 (13.2)
Variable	Somewhat /Very well N (%)	Neutral N (%)	Somewhat/Very poorly N (%)
How well do you feel supported by your social support/friends/family	105(87.5)	8(6.7)	7(5.8)
Variable	Somewhat supportive	Neutral	Somewhat hostile
How would you describe what would occur if you reached out for help to those in your learning and work environment	94(78.3)	14(11.7)	12(10.0)
Variable	Yes	Somewhat	No
Do you feel that your residency program has enough strategies aimed at resident's well-being in place	38(31.7)	46(38.3)	36(30.0)

Table 2 shows a summary of the results of univariate analysis of the association between respondents' demographic profile, professional satisfaction, workplace collegiality variables, and likely Major Depressive Disorder (MDD).

In this study, 35 out of 123 (28.5%) participants met the cut-off for likely MDD as measured by the PHQ 9.

The Chi-square test showed a significant ($p \leq 0.05$) relationship between 15 socio-demography, Professional satisfaction and workplace collegiality variables, and MDD, including; "*What residency program are you part of, how many total hours do you work per week (Clinical and non-clinical), quality of your learning environment, workload and job demand, control and flexibility, work-life integration (meeting personal and professional obligations), efficiency and resources, overall, I am satisfied with pursuing a career in medicine, In general, I find my colleagues to be supportive, people treat each other with respect in my work group, a spirit of cooperation and teamwork exists in my work group, disputes or conflicts are resolved fairly in my work group, how well do you feel supported by your social support/friends/family, how would you best describe what would occur if you reached out for help to those in your learning and work environment, do you feel that your medical school has enough strategies aimed at medical student's well-being in place.*

Table 2: Association between sociodemographic characteristics, workplace collegiality, and Likely Major Depressive Disorder

Characteristics		MDD Present (%)	Chi-square value/Fischer's exact test* value	P-value	Effect Size (Phi/Cramer's V's)
Age	<30	17(23.3)	2.356	0.125	0.138
	>31	18(36.0)			
Gender	Male	16(34.0)	1.166	0.309	0.097
	Female	19(25.0)			
Dependents	No	23(26.7)	0.411	0.663	0.058
	Yes	12(32.4)			
Relationship Status	In a relationship	25(26.3)	0.938	0.348	0.087
	Not in a relationship	10(37.5)			
Dependent	No	52(33.1)	0.335	0.122	0.503
	Yes	12(7.6)			
Ethnicity	Caucasian	20(24.4)	1.997	0.158	0.127
	Others	15(36.6)			

Characteristics		MDD Present (%)	Chi-square value/Fischer's exact test* value	P-value	Effect Size (Phi/Cramer's V's)
How much debt do you currently have	<$100,000	14(22.2)	2.465	0.161	0.142
	>$100,000	21(35.0)			
What year of residency training are you currently in	PGY-1	6(18.8)	4.599	0.479	0.193
	PGY-2	8(26.7)			
	PGY-3	5(29.4)			
	PGY-4	7(29.2)			
	PGY-5	6(50.0)			
	PGY-6 and above	3(37.5)			
What residency program are you part of	Surgical Specialties	9(40.9)	11.321	**0.022***	0.303
	Family Medicine	3(10.0)			
	Internal Medicine	12(41.4)			
	Psychiatry	1(9.1)			
	Others	10(32.3)			
How many total hours do you work per week (Clinical and non-clinical	<80 hours	18(19.4)	15.511	**<0.001***	0.355
	>80 hours	17(56.7)			
Quality of peer collaboration among residents' colleagues	Satisfied	25(26.3)	2.263**	0.345	0.135
	Neither	4(26.7)			
	Dissatisfied	6(42.6)			

Characteristics		MDD Present (%)	Chi-square value/Fischer's exact test* value	P-value	Effect Size (Phi/Cramer's V's)
Quality of interaction with your attending physicians	Satisfied	23(24.5)	4.722**	0.088	0.2
	Neither	5(31.3)			
	Dissatisfied	7(53.8)			
Quality of your learning environment	Satisfied	17(19.3)	13.536	**0.001***	0.332
	Neither	11(57.9)			
	Dissatisfied	7(43.8)			
Workload and job demand	Satisfied	6(10.9)	24.881	**<0.001***	0.45
	Neither	7(23.3)			
	Dissatisfied	22(57.9)			
Control and flexibility	Satisfied	2(6.3)	14.288	**<0.001***	0.341
	Neither	5(20.8)			
	Dissatisfied	28(41.8)			
Work-life integration (meeting personal and professional obligations)	Satisfied	2(5.4)	23.596	**<0.001***	0.438
	Neither	7(20.0)			
	Dissatisfied	26(51.0)			
Efficiency and resources	Satisfied	4(9.3)	17.326	**<0.001***	0.375
	Neither	14(29.2)			
	Dissatisfied	17(53.1)			

Characteristics		MDD Present (%)	Chi-square value/Fischer's exact test* value	P-value	Effect Size (Phi/Cramer's V's)
Overall, I am satisfied with my career in medicine	Agree	10(12.8)	25.976	**0.001***	0.46
	Neither agree/disagree	17(58.6)			
	Disagree	8(50.0)			
In general, I find my colleagues to be supportive	Agree	24(23.3)	8.600**	**0.013***	0.274
	Neither agree/disagree	8(50.0)			
	Disagree	3(75.0)			
People treat each other with respect in my work group	Agree	21(21.9)	9.019**	**0.009***	0.276
	Neither agree/disagree	8(50.0)			
	Disagree	6(54.5)			
A spirit of cooperation and teamwork exists in my work group	Agree	21(21.9)	9.019**	**0.009***	0.276
	Neither agree/disagree	8(50.0)			
	Disagree	6(54.5)			
Disputes or conflicts are resolved fairly in my work group	Agree	15(19.2)	9.288	**0.009***	0.275
	Neither agree/disagree	12(41.4)			
	Disagree	8(50.0)			
How well do you feel supported by your social support/friends/family	Somewhat/Very well	25(23.8)	8.585**	**0.008***	0.279
	Neutral	4(50.0)			
	Somewhat/Very Poorly	5(71.4)			

Characteristics		MDD Present (%)	Chi-square value/Fischer's exact test* value	P-value	Effect Size (Phi/Cramer's V's)
How would you best describe what would occur if you reached out for help to those in your learning and work environment	Somewhat/Very supportive	19(20.2)	15.426**	**<0.001***	0.375
	Neutral	10(71.4)			
	Somewhat/Very hostile	5(41.7)			
Do you feel that your medical school has enough strategies aimed at medical student's well-being in place	Yes	3(7.9)	14.243	**<0.001***	0.345
	Somewhat	14(30.4)			
	No	17(47.2)			

Table 3 below shows the logistic regression model to determine the likelihood of MDD among resident physicians who participated in the survey.

The model included 9/16 out of the chi-square predictor variables, including one variable near significance, after the removal of six variables:

Quality of interaction with your attending physicians, In general, I find my colleagues to be supportive, People treat each other with respect in my work group, and A spirit of cooperation and teamwork exists in my work group, How well do you feel supported by your social support/friends/family, How would you best describe what would occur if you reached out for help to those in your learning and work environment which showed lack of variability condition in fisher exact test. One variable was removed, "workload and job demand," which showed a high correlation with another variable (rs > 0.7), "work life and integration."

The logistic model was statistically significant; X2 (df=19; n=120) = 63.36, p < .001, showing that the model can differentiate between study participants with the presence or absence of MDD. The model accounted for 41.0% (Cox and Snell R2) to 58.9% (Nagelkerke R2) of the variance. According to the goodness-of-fit statistic using the Hosmer-Lemeshow goodness-of-fit test, the model adequately fit (Chi2= 10.45; p = 0.234) correctly classified 87.5% of cases.

Resident physicians who were neither satisfied nor dissatisfied with their career in medicine were 20 times more likely to have likely MDD than those who expressed satisfaction with their career in medicine (OR=20.050; 95% CI: 3.963 – 101.446).

Resident physicians who work more than 80 hours per week were about nine times more likely to have likely MDD than those who work less than 80 hours per week (OR=8.720; 95% CI: 1.579 – 48.164).

Table 3: Logistic regression model for resident physicians' likelihood to present with likely Major Depressive Disorder

Variables in Equation	Coefficient	Standard Error	Wald	Degree of freedom	P value	Odd's Ratio		95% C.I. for Odd's Ratio
							Lower	Upper
What residency program are you a part of? Surgical Specialties Family Medicine Internal Medicine Psychiatry Others	0.091 0.950 0.174 1.568	1.179 0.931 1.707 0.994	3.567 0.006 1.041 0.010 2.488	4 1 1 1 1	0.468 0.939 0.308 0.919 0.115	1.095 2.586 1.190 4.799	0.109 0.417 0.042 0.684	11.032 16.040 33.770 33.694
How many total hours do you work per week (clinical and non-clinical)? >40	2.166	0.872	6.169	1	0.013	8.72	1.579	48.164
Quality of your learning environment Satisfied Neither Dissatisfied	1.787 -0.808	0.933 1.130	5.601 3.670 0.512	2 1 1	0.061 0.055 0.474	5.696 0.446	0.960 0.049	37.135 4.07
Control and flexibility **Satisfied** **Neither** **Dissatisfied**	-0.309 0.221	1.238 1.196	0.340 0.062 0.034	2 1 1	0.844 0.803 0.853	0.734 1.247	0.065 0.120	8.315 12.992
Work-life integration (meeting personal and professional obligations) **Satisfied** **Neither** **Dissatisfied**	1.235 1.383	1.119 1.202	1.480 1.218 1.324	2 1 1	0.477 0.270 0.250	3.438 3.986	0.384 0.378	0.819 42.025

Variables in Equation	Coefficient	Standard Error	Wald	Degree of freedom	P value	Odd's Ratio	95% C.I. for Odd's Ratio	
							Lower	Upper
Efficiency and resources Satisfied Neither Dissatisfied	1.231 1.678	0.928 0.968	0.928 0.968	2 1 1	0.216 0.185 0.083	3.425 5.356	0.555 0.803	21.124 35.713
Overall, I am satisfied with my career in medicine. Agree Neither agree/disagree Disagree	2.998 1.811	0.827 1.101	13.178 13.136 2.703	2 1 1	.001 <.001 0.100	20.050 6.115	3.963 0.706	101.446 52.959
Disputes or conflicts are resolved fairly in my workgroup. Agree Neither agrees/disagree	.271 -.457	0.814 0.998	0.537 0.111 0.210	2 1 1	0.765 0.739 0.647	1.312 0.633	0.266 0.089	6.461 4.480
Do you feel that your residency program has enough strategies aimed at resident well-being in place? **Yes** **Somewhat** **No**	0.439 0.382	0.966 1.109	0.207 0.207 0.119	2 1 1	0.902 0.649 0.730	1.552 1.465	0.233 0.167	10.316 12.882
Constant	-6.361	1.731	13.501	1	<.001	0.002		

Discussion

Despite several pieces of literature on depression among medical professionals, there is limited information about the prevalence and correlates of depression among resident physicians across all specialties. In addition to this, data on the prevalence and correlates of depression among resident physicians in Canada have been lacking. This study showed that the prevalence of depression among resident physicians who participated in this study was 29.1%. Several studies have suggested that resident physicians experience higher rates of depression than the public [10, 27,28]. The range of prevalence of MDD reported in these studies is from 28. 8% to 37%. For instance, Schneider et al [10] reported a prevalence of 35% among resident physicians during their training, this may be indicative of long hours of work, including midnight shifts, in stressful environments, and their training program provides little time for personal life, hobbies, or self-care Their employment might also make it hard to reconcile work and life balance. Mata et al, [27] found that 28.8% of resident physicians had depression or depressive symptoms, substantially higher compared to the 3.8% in the general population [28].

In a systematic review and meta-analysis of 54 studies involving 17,569 physicians in training, findings from this study indicated that 20.0% and 43.2% of resident physicians screened positive for depression or depressive symptoms during their residency [27]. The onset of depression is associated with an increased risk of subsequent episodes of depression as well as an increased risk of morbidity over the long run, suggesting that these results may have an impact on the productivity and quality of life of resident physicians over the long term [29,30,31]. These findings are in line with other studies indicating the frequency of depressed symptoms is comparable across different studies on the prevalence of MDD among resident physicians. This also shows that underlying causes of depressive symptoms are common to the experience of residency training.

In our study, we found that resident physicians who reported feeling neither satisfied nor dissatisfied with their careers in medicine were 20 times more likely to experience depression compared to those who expressed satisfaction with their medical careers. This is consistent with a systematic review study that found that work overload, lack of control, insufficient reward, breakdown of community, lack of fairness, and conflicting values between job requirements among resident physicians could cause dissatisfaction in their careers [32]. Generally, there is an agreement among studies that depression is associated with dissatisfaction in pursuing a medical career among physicians [27]. A study conducted by Gong et al. [34] showed that there are several mental health factors, including depression and work-related stress, that are negatively correlated with residents' job performance. Other studies have shown that resident physicians who are satisfied with their medical career would prefer reduced work hours and are more likely to leave the medical workforce [35]. Consequently, resident physicians who are satisfied with their career in medicine were associated with better doctor-patient relationships [36] and reduced burnout. Residents who are well satisfied with their careers may be able to adapt to job-related stress and challenges better than those who are not enjoying their careers. They are also likely to exhibit resilience and tenacity when they are faced with persisting challenges and difficulties on the job. Mache et al [37] suggested that people who are satisfied in their careers have higher psychological resilience and are more willing to become engaged in their work. This study suggested that satisfaction in a medical career was negatively correlated with depression, which is consistent with a previous study [38] that showed a high relationship between depression and career satisfaction and performance among resident physicians in China.

Additionally, this outcome might be attributed to the fact that satisfaction with one's career and its effect on mental well-being is not a straightforward and linear phenomenon. One possible reason for this might be that the uncertainty about one's career might indicate an intrapersonal conflict or psychological discomfort. Some of the resident physicians may be in doubt concerning their career progression or disagree with various aspects of the medical profession as they find them while practicing. This internal conflict may lead to the enhancement of psychological stress and, therefore, the possibility of MDD [39].

Shanafelt et al. suggested that meaningful work and professional satisfaction are factors that can reduce the risk of burnout and MDD among medical professionals [40]. Therefore, this ambivalence might be a sign that some of the resident physicians may not have passion for their careers in medicine and might feel distanced from their jobs. This may result in idle and helpless emotions, thereby making them prone to depression.

In addition, this study finding also indicated that resident physicians who work more than 80 hours per week were about nine times more likely to have MDD than those who work less than 80 hours per week, this aligns with a study [41] on the relationship between long working hours and depression among residents' physicians. The study suggested that there is a relationship between working hours and depressive symptoms among resident physicians, with 25.1% of residents who worked more than 80 hours per week and 45.5% of those who worked for 80 hours per week or more experiencing newly developed depressive symptoms. Ogawa et al [41] further found that the proportion of new-onset depressive symptoms increased with increasing working hours among the resident physicians. This tendency was significant, especially in cases where the working hours exceeded 80 hours per week.

Study Limitation

One limitation of the online survey is the potential for resident physicians with biases to self-select for inclusion in the sample. Furthermore, the survey garnered responses from only 140 individuals, which represents a relatively small proportion of the 1,594 resident physicians in Alberta at the time of the study. This limited participation may be attributed to the survey's optional nature rather than its mandatory nature.

The descriptive cross-sectional study design may have limited our ability to establish a causal relationship between satisfaction with a career in medicine and the risk of MDD. It is also unclear whether the ambivalence towards their career in medicine can lead to depression or if depressive symptoms can contribute to a lack of clear career satisfaction. Therefore, it is important to establish whether these variables have a sequential relationship over time, and more longitudinal studies are needed in this area.

Study data were collected before COVID-19 and other local events, which may have had a greater impact on residents' doctors' well-being. As such, the prevalence of MDD may have increased. A high PHQ9 score is not synonymous with MDD and only suggests a likelihood of MDD.

Conclusion

Research has revealed a concerning uptick in Major Depressive Disorder (MDD) rates among resident physicians. In our study, the prevalence of probable MDD among resident physicians stood at 29.1%. Factors such as prolonged work hours in high-pressure environments and dissatisfaction with their medical careers can create emotional hurdles, rendering physicians more vulnerable to heightened stress and despair during residency. Issues like disrupted work-life balance, sleep deprivation, and excessive workplace expectations may compound this risk.e optimized to foster good working conditions, promote work-life balance, and offer wellness support tailored to their needs. Measures such as counseling services and robust mentoring from senior physicians can significantly contribute to mitigating depression among resident physicians.

Recognizing the high incidence of depression among resident doctors and making early efforts to address or mitigate it may improve physicians' health overall outcomes at population levels, MDD has likely been significantly associated with job satisfaction. This condition establishes how the problem of depression should be addressed in the contexts of training, education, and work. Residency programs for physicians are essential to improving training quality. Working more than the required hours could compromise the quality of training and affect their output.

Some interventions are needed among resident physicians to ensure their job satisfaction and mental health well-being, such as reducing work hours and building capacity, which can contribute to reducing depression symptoms among resident physicians. Institutional support for healthcare workers, and in particular resident physicians, is imperative in protecting and promoting their mental health.

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Conflict of Interest Disclosure

None

Authors' contribution

The study was conceived and designed by VOA. F.O. drafted the initial manuscript and conducted data analysis. E.E. & R.S. contributed to data collection and data analysis. All authors contributed to the study design, reviewing and revising the initial draft manuscript, and approved the final draft before submission.

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