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## Naturopathic medical student empathy and burnout: A preliminary study

Matthew Hicks\*, Douglas Hanes

National University of Natural Medicine, Portland, Oregon, United States

### Abstract

**Background:** Many studies have demonstrated empathy decline in medical students over the course of training. Burnout negatively affects academic or professional performance and has been negatively correlated with empathy. Neither empathy nor burnout has been previously studied in naturopathic medical students.

**Objective:** The aims of this cross-sectional study were to (1) compare empathy at different levels of training, (2) describe the prevalence of burnout, and (3) identify correlations between empathy and burnout, in naturopathic medical students.

**Methods:** This cross-sectional study used the Interpersonal Reactivity Index and Maslach Burnout Inventory to measure empathy and burnout, respectively, in an online survey of current naturopathic medical students at one institution.

**Results:** 1) There was no significant difference in empathy between any cohorts or between those in internship versus those not in internship. 2) Among burnout outcomes, 42% of participants met criteria for emotional exhaustion, 19% for depersonalization, and 64% for low sense of personal accomplishment. 3) Cognitive empathy was positively correlated with affective empathy and a higher sense of personal accomplishment and negatively correlated with emotional exhaustion and depersonalization.

**Conclusions:** While a longitudinal study would provide more definitive evidence, this study suggests that empathy in naturopathic medical students is relatively stable over the course of training. It also demonstrates that burnout is prevalent in this population and has an inverse relationship with empathy. Interventions to prevent burnout and increase empathy are discussed.

### Keywords

Naturopathic; Naturopathy; Medical students; Empathy; Burnout

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\*Corresponding author at: National University of Natural Medicine, 049 SW Porter St., Portland, OR, United States. [Matthewhicks12@gmail.com](mailto:Matthewhicks12@gmail.com) (M. Hicks).

Notes on contributors

Matthew Hicks was the primary author of this paper. Doug Hanes was the consulting statistician and assisted with the study design and preparation of the manuscript.

Conflicts of interest

The author has no conflict of interest to disclose.

## 1. Background

Naturopathic medicine is an holistic approach to health that includes the use of botanicals, nutrition, physical medicine, and pharmaceuticals, among other therapies. Naturopathic medical students are trained to diagnose and treat patients as primary care providers, with an added emphasis on integrative approaches. Consequently, this requires a robust biomedical understanding of pathology and the standards of care for treatment. Available data suggest that visits to naturopathic doctors are more likely to address chronic conditions, especially musculoskeletal pain and fatigue, and less likely for routine examinations or infectious conditions when compared to conventional primary care doctors. However, 32% of the 25 most frequently used ICD codes used by Naturopathic and conventional doctors are the same. This data is based on records from teaching clinics of four Naturopathic institutions and not from Naturopathic doctors in practice [1].

Naturopathic medical students in North America are required to possess Bachelor's degrees from accredited colleges and universities upon admission. They attend one of the eight graduate level medical schools accredited by the federally recognized Council on Naturopathic Medical Education as well as their regional accrediting bodies. At the completion of a four-year program students are awarded a Doctor of Naturopathy (ND) degree at which point they have completed a comparable number of training hours to a conventional MD. Graduates must then pass two board exams administered by the North American Board of Naturopathic Examiners to become licensable in the 20 states and 5 provinces in the United States and Canada that have laws regulating the practice of Naturopathic Medicine. While training residencies are available to graduates, they are not currently required, unlike MDs, to obtain a license. The National University of Natural Medicine (NUNM) is the oldest (1956) and second largest accredited naturopathic institution in North America, located in Portland, Oregon. It offers several degree programs that can be taken individually or concurrently with the naturopathic program (see Table 1 for basic demographics). While there have been many studies on empathy and burnout in conventional medical doctors and students, no studies have reported on either empathy or burnout among practicing naturopathic doctors or those in training.

### 1.1. Empathy

Physician empathy is the ability of a physician to sense the emotional state and concerns of a patient and communicate this understanding and an intention to help. *Affective* empathy is reactive to another person's emotions. *Cognitive* empathy involves being aware of another person's emotions while still maintaining a distinction between what is observed and one's own emotional state.<sup>2</sup> While both components are important, too much affective and not enough cognitive empathy can result in a stress response.

Multiple studies have demonstrated that empathy declines over the course of medical school and residency [3-5]. A 2011 systematic review that included three longitudinal and six cross sectional studies on medical students found significant decreases in empathy over the course of training [6]. A few studies, however, have been unable to find evidence for a change over time [7,8], and some argue that more sophisticated measures are necessary to understand the complexities of empathy among medical students [9,10].

Physician empathy is positively associated with objective ratings of clinical competency [11], communication [12], and overall patient satisfaction [13-16]. Empathetic care can also impact clinical outcomes including better management of diabetes, dyslipidemia [17], and the common cold [18].

**1.1.1. Changes in empathy among medical students**—In a longitudinal study of 1162 medical students at Boston University published in 2012, empathy scores among all students slightly increased in the first two years, but declined in the final two years of medical school [3]. The study also found that students in the highest third of empathy scores experienced a steady but small decline in empathy over time, whereas students in the low and moderate tertiles saw a sharp decline in the third year. The decline in the third year corresponds with clinical internship, which the authors describe as having a “de-idealizing” effect on students.

Several intervention studies have reported that mind-body programs delivered to medical students are able to improve self-compassion, self-regulation, stress reduction, and empathy [19-21]. A systematic review of all the literature involving Mindfulness Based Stress Reduction interventions on healthcare providers published in 2016, found several benefits to MBSR [22], including reductions in burnout, stress, anxiety, and depression. Five studies that directly measured effects of MBSR on empathy each reported significant improvements in empathy scores [23-27]. Interventions using discussion groups that focus on humanistic values may also be an effective means of improving empathy in medical students [28], including two recent studies using randomized control groups [29,30].

## 1.2. Burnout

Professional burnout is characterized by emotional exhaustion, cynicism and depersonalization that negatively affects academic or professional performance [31]. It is especially common among human services professionals who interact with people in emotionally charged states. Burnout is measured using subjective questionnaires. The most commonly used measure is the Maslach Burnout Inventory.

Even short term stressful circumstances reduce empathy and compassion [32-35]. Burnout, however, is not the same thing as acute stress, as it is primarily the result of chronic academic or occupational stress. It can, however, increase one’s risk for psychological distress and depression [36,37]. Many studies have demonstrated that burnout is a problem among both undergraduate and graduate medical students [38-40] and that it worsens over the course of training [36,41]. A systematic review of studies that measured stress and burnout in preclinical medical students found that the prevalence of burnout ranged from 27% to 75% across eight studies [42]. Moreover, multiple studies of medical students have confirmed negative correlations between empathy and burnout [35,43-45].

According to a meta-analysis that included 82 studies and 210,699 providers, burnout negatively correlates with quality and safety of care [46]. In one famous case in 1998, two overworked and unsupervised residents failed to recognize a drug interaction and instead ordered restraints on a patient experiencing serotonin syndrome resulting in the patient’s death [47]. This case resulted in the Libby Zion law in the state of New York which restricts

the number of hours residents can work and includes other regulations, many of which were adopted by the accreditation body for medical residencies in 2003. In less severe cases burnout results in career dissatisfaction and turnover.

Stress reduction is the primary means of reducing burnout. Several intervention-based studies have demonstrated successful strategies of reducing burnout, some of which have already been discussed for improving empathy [21,22,39,40,48,49]. Naturopathic medicine is a growing profession in North America and offers an alternative approach to training physicians and providing patient care. However, other than educational curriculum and a holistic philosophy, little is known about how naturopathic medical students or doctors compare to their conventional counterparts. Our hypothesis was that the holistic philosophy held by most Naturopathic students may result in differences in empathy compared to conventional medical students. However, given the academic rigor of the program, we suspected comparable trends in burnout. Presently, no studies have attempted to measure empathy or burnout among naturopathic medical students. This study begins to bridge that gap.

## 2. Aims

The goals of this study are to (1) compare levels of empathy at different levels of training, (2) describe the prevalence and severity of burnout, and (3) identify correlations between empathy and burnout, among naturopathic medical students.

## 3. Methods

A cross-sectional design was used to measure empathy, burnout, and demographic information of Naturopathic medical students at a single institution using an electronically delivered survey. The study was approved by the institutional review board at the National University of Natural Medicine.

### 3.1. Measures

Demographic information was collected including gender, age, and year in school. Participants were also asked if they were in a concurrent program, what program, if applicable, how many years it would take them to complete their program, credit hours currently enrolled in, and if they were currently an intern in the clinic. Because of the many track options available, students in their fourth, fifth, or sixth year were merged into one group to have adequate power for the analysis.

Empathy was measured using the Interpersonal Reactivity Index (IRI). The IRI is a widely used and validated measure of empathy [2,33]. It was developed to measure empathy in the general public, but it has also been used among healthcare workers and students [6,35,50]. The IRI is comprised of four subscales that measure independent facets of empathy. They are: Empathic Concern, Perspective Taking, Personal Distress, and Fantasy. Empathic Concern measures the emotional or affective component of empathy while Perspective Taking measures the cognitive component of empathy. These are the two subscales most frequently measured in medical professionals. Personal Distress measures an individual's

perceived level of stress or anxiety and Fantasy measures a person's affinity to feel empathy for fictional characters. To be thorough, all four subscales were included in the online survey. Each subscale features seven questions answered on a five-point Likert scale from 0, "does not describe me at all", to 4, "describes me very well;" responses are summed to produce the subscale score. Scores are reported as the total (0–28) for each subscale and used as continuous dependent variables for Study Aims 1 and 3. The Jefferson Scale of Physician Empathy (JSPE) is a validated [51] and more widely used instrument for this purpose [52]. A key difference is that many of its items measure clinician's attitude about empathy toward patients as opposed to measuring one's self-perceived level of overall empathy. Its orientation to patient care may better reflect declines or improvements in empathy in clinically relevant ways, however, more research is needed to demonstrate this. For our purposes the JSPE had a prohibitive licensing fee.

The Maslach Burnout Inventory (MBI) [31] is the most widely used instrument for measuring burnout and has been validated in several populations [53]. It is a copyrighted instrument and the appropriate licensing fee was paid to MindGarden, Inc. The MBI has 22 total questions divided into three distinct subscales. The scale for each question is from zero, "I never feel this way," to six, "I always feel this way." The Emotional Exhaustion subscale has nine questions (score range: 0–54) and describes the feeling of being overextended and exhausted by one's work. Personal Accomplishment has eight questions (0–48) and describes feelings of competence and achievement. Depersonalization has five questions (0–30) and describes feeling apathy and impersonal responses toward others. Personal accomplishment should be interpreted inversely, with a low score reflecting a higher degree of burnout. These scores are used as continuous dependent variables for Study Aims 2 and 3. Additionally, Maslach described the following score ranges that enable a categorical context for results that was also used for Study Aim 2: Emotional exhaustion scores 0–16 (low), 17–26 (moderate), and 27+ (high); Personal Accomplishment scores 39+ (low), 32–38 (moderate), and 0–31 (high); Depersonalization score 0–6 (low), 7–12 (moderate), and 13+ (high) [54].

### 3.2. Procedure

Flyers were posted around campus, in-class announcements were made, and two emails were sent to all current Naturopathic students at the xxx during the spring term of 2016. The survey was open for 30 days. Participation was voluntary. The only incentive for participation was a chance to win one of four \$50 gift cards. At the completion of data collection, the online survey was disabled. The data were collected using REDCap, a database platform commonly used for research purposes. All participants provided informed consent before beginning the survey.

### 3.3. Data analysis

Data were analyzed using the statistics package SPSS (version 23.0). Descriptive statistics were calculated as means, standard deviations, and 95% confidence intervals, for continuous variables; and as proportional distribution across levels for categorical variables. Descriptive statistics for empathy and burnout scores were calculated for each subscale for the entire population and separated by gender, clinical vs. pre-clinical phase of training, year in

school, stand-alone vs. concurrent degree, and concurrent degree program. Independent *t*-tests assessed for differences in empathy and burnout scores between male and female genders and between clinical vs. pre-clinical students. Differences in empathy and burnout, by year in school, were assessed using one-way ANOVAs with post-hoc comparisons. Independent effects on empathy scores were assessed using an ANCOVA model with year in school as the primary factor, adjusted for gender, concurrent degree status, and credit hours taken. Sensitivity to gender interactions with other factors were assessed using separate two-way ANOVAs of gender and each demographic variable, especially testing for a possible moderation of the effect of year in school on empathy. Correlations between empathy subscales and burnout were assessed using Pearson's correlation coefficient; moderation of this relationship by gender was further assessed using a regression including gender and an empathy\*gender interaction.

## 4. Results

Of 409 Naturopathic students who were enrolled at the school at the time of the survey; 134 (33%) started the survey and gave consent; 128 went on to complete the demographics portion; 115 completed the Interpersonal Reactivity Index (IRI); and 112 completed the Maslach Burnout Inventory (MBI). Participants were 80% female compared to 77% of all eligible students (Table 1).

Raw scores of the Interpersonal Reactivity Index broken down by various demographic categories are presented in Table 2. The raw scores of the Maslach Burnout Inventory are presented in Table 3.

### 4.1. Study aim 1

A one-way ANOVA revealed no significant relationship between year in school and empathy scores ( $F=.47$ ,  $p=.71$  for empathic concern;  $F=.55$ ,  $p=.65$  for perspective taking). As can be seen in Table 2, there was no consistent trend in how any of the empathy scores changed, with increasing number of years in school. Exploratory analysis likewise revealed no significant moderation of the effect of year on empathy by gender (all  $p > .05$ ).

It had previously been suggested that one factor affecting empathy among medical students was the experience of being in clinic. Independent *t*-test were run for each subscale of the Interpersonal Reactivity Index to assess for a difference in those students who were not yet in their clinical internship against those who were. No significant difference for any of the subscales were found ( $t=.20$ ,  $p=.85$  for empathic concern;  $t=.43$ ,  $p=.67$  for perspective taking).

### 4.2. Study aim 2

To describe the prevalence and severity of burnout, participants were divided into ranges of severity as described by Maslach. As shown in Table 4, 64% of students feel they have a low sense of personal success or achievement, 42% of participants meet criteria for a high degree of emotional exhaustion, and 19% meet criteria for a high degree of depersonalization. Independent *t*-tests demonstrated that students experienced greater emotional exhaustion in clinical internship compared to those who were not ( $p < .05$ ) and that those in a

concurrent degree program experienced greater emotional exhaustion compared to those in the naturopathic program alone ( $p < .01$ ). We did not observe effects on any of the other burnout subscales. There was also no significant difference in burnout measures between genders. The ANOVA for year in school revealed a significant difference in emotional exhaustion between 1<sup>st</sup> year students and those in their 4<sup>th</sup>, 5<sup>th</sup>, or 6<sup>th</sup> year (mean difference of 6.71,  $p < .05$ ). Students in their 3<sup>rd</sup> year showed a similar increase in emotional exhaustion (6.75 pts, relative to 1<sup>st</sup> year), but this comparison was not significant ( $p=.051$ ), likely due to the smaller 3<sup>rd</sup> year group size.

#### 4.3. Study aim 3

To assess associations between burnout and empathy, we computed Pearson correlations between all the subscales of the Interpersonal Reactivity Index and Maslach Burnout Inventory (Table 5). Noteworthy correlations between IRI and MBI subscales include Perspective Taking (cognitive empathy) being negatively correlated with Emotional Exhaustion ( $r = -.19$ ,  $p < .05$ ) and Depersonalization ( $r = -.33$ ,  $p < .01$ ) while positively correlated with Personal Accomplishment ( $r=.27$ ,  $p < .01$ ). Empathic Concern (affective empathy) was strongly negatively correlated with Depersonalization ( $r = -.43$ ,  $p < .01$ ), while also negatively correlated with Emotional Exhaustion ( $r = -.23$ ,  $p < .05$ ) and positively correlated with Personal Accomplishment ( $r=.24$ ,  $p < .05$ ). All correlations between the IRI and MBI were in the expected direction, with higher empathy correlating to lower levels of burnout. Finally, we conducted exploratory analyses of moderation of the relationship between IRI and MBI by gender; interaction terms assessing gender modification were non-significant ( $p > .05$ ) in all analyses.

#### 4.4. Additional analyses

Using independent t-tests, we found significant differences between men and women on the Fantasy ( $p=.02$ ) and Empathic Concern ( $p=.03$ ) subscales; Perspective Taking ( $p=.65$ ) and Personal Distress ( $p=.35$ ) did not significantly differ between men and women. Females had higher mean scores on all four subscales. To assess for independent effects on empathy scores, after adjustment for other factors, each subscale of the IRI was modeled using *gender, year in school, clinic vs. pre-clinic status* and *credit hours* as predictors. The only significant predictor in these analyses was gender for Empathic Concern; after adjustment, males had a mean score 2.51 points less than that of females ( $p=.02$ ).

### 5. Discussion

Although there is no established level of empathy that has been described as ideal for physicians, it is of interest to compare empathy ratings observed in studies of different populations. Table 6 shows Empathic Concern and Perspective Taking subscale scores from studies that used the IRI to measure medical student empathy, including results of the current study. As can be seen, empathy scores in our study of naturopathic medical students (with mean scores of 21.3 for Empathic Concern and 20.1 for Perspective Taking) are quite comparable to those that have been observed in conventional medical students.



The Maslach Burnout Inventory (MBI) provides categorical scoring parameters that allow its users to describe who fits the criteria for burnout. However, what is an acceptable percentage of medical students experiencing burnout at any given school remains a matter of judgment. For comparison, Table 7 provides MBI results from a few published studies. (Some authors report mean scores; others only report how many participants meet the burnout criteria.) The means in this study were 25.9 for Emotional Exhaustion, 6.8 for Depersonalization, and 29.9 for Personal Accomplishment. For Emotional Exhaustion 42.0% of students met burnout criteria, 18.8% for Depersonalization, and 64.3% for low Personal Accomplishment. As can be seen in Table 7, our sample of naturopathic students generally had lower mean Emotional Exhaustion and Depersonalization scores than had been reported in studies of conventional medical students, but also a lower mean of Personal Achievement. When comparing categorical markers of burnout, however, contrasts are much more mixed. It is unsurprising that students in their latter years of medical school or in more than one degree program are more burned out.

There are several reasons why caution is warranted in making comparisons. First, regarding empathy, we are limited to comparing to studies that used the Interpersonal Reactivity Index, omitting a significant portion of the literature on the topic that used the Jefferson Scale of Physician Empathy (JSPE). Regarding burnout, there is a wide range of prevalence and severity from study to study that may relate to a multitude of potential factors, such as timing when the questionnaire is given, the curriculum at various schools, the type of environments students are exposed to, etc., that is beyond the scope of this study to untangle. Furthermore, it would be inappropriate to draw any conclusions based solely on such a comparison of empathy or burnout between Naturopathic and conventional medical students. The available data on conventional students were collected before specialization which occurs during residency, thus averaging empathy scores of future surgeons, psychiatrists, and family medicine practitioners, who may already exhibit different levels of empathy and tolerance to burnout. Our review of the literature found only two studies that controlled for specialization preference in analyzing empathy [3,4]. Naturopathic students, who do not specialize, might better be compared to primary care providers who provide a comparable level of care. Such a comparison is difficult with students.

A longitudinal study would be necessary to provide a more definitive answer as to whether empathy declines over the course of training (Study Aim 1). This cross-sectional study found that there was no significant difference in any empathy subscales between students in clinical internship versus those who had not yet reached that level in their education, nor was there any significant difference between cohorts by year. Although these findings suggest that empathy is reasonably stable among Naturopathic medical students throughout their training, we cannot rule out such changes without further study. Furthermore, with a response rate of only 30%, there is a likelihood of bias among participants (i.e. students with a stronger interest in empathy being more likely to participate) making it difficult to accurately compare to studies that had higher response rates.

Despite the comparability to findings in other medical students, the proportion of students experiencing burnout (Study Aim 2) seems high. Medical school is inherently stressful due to the volume of information that must be learned, the weight of responsibility that comes



with being a physician, the large amount of debt that students acquire, and trying to balance the many requirements of medical school with those of everyday life. As such, it is expected that students will experience stress, and that it will be experienced differently for each of them. These sorts of findings are likely why a recent study found that 30% of conventional medical schools are offering mindfulness related curriculum to students [55].

The correlations between empathy and burnout (Study Aim 3) were consistent with other findings in the literature [35,43,44,56]. Of note, cognitive empathy (Perspective Taking) was positively correlated with affective empathy (Empathic Concern) and a sense of Personal Accomplishment and negatively correlated with Emotional Exhaustion and Depersonalization. As with all correlations, one can only speculate if burnout causes reductions in empathy or whether individuals with low empathy are more likely to experience burnout. The present study is unable to provide an answer to this question.

### 5.1. Limitations

Research on empathy and burnout is largely dependent on subjective questionnaires. Thus, despite the validity of the instruments used it is subject to participant bias and the circumstances at the time the survey was taken. Having a 30-day period in which participants could complete the questionnaires may have reduced circumstantial biases. Because participation was voluntary, and we were not able to administer the survey to all students or cohorts simultaneously, students had to fill out the survey on their own time which required some initiative on their part. This resulted in a low response rate and introduced potential for a self-selection bias among those students who chose to participate versus those who did not. However, participants appear to have been representative of eligible students. Because of the multiple tracks available to students at NUNM it became necessary to combine students in their 4<sup>th</sup>, 5<sup>th</sup>, and 6<sup>th</sup> year in order to capture all students in their final year and not leave each of those individual cohorts too small to power an analysis. Furthermore, this study used a cross-sectional analysis rather than a longitudinal model, so we cannot rule out cohort effects.

## 6. Conclusion

This is the first study to measure empathy or burnout in Naturopathic medical students. No significant differences in empathy were found between students at different levels of training. Levels of empathy in this population were found to be similar to those in conventional medical students. Means and prevalence of burnout in medical students varies in the literature, but Naturopathic medical students do not appear to be substantially better or worse. Burnout and empathy also appear to have an inverse relationship which is consistent with findings throughout the literature. Regardless of whether empathy declines or burnout increases, our results suggests that a substantial number of medical students experience impactful challenges. Studies aimed at determining the factors that result in burnout, such as access to support services, housing, hours spent studying, number of examinations, etc. may provide information that would enable interventions to reduce burnout and improve empathy among student populations.

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**Table 1**

Demographics of those completing the IRI (N = 115) compared to available demographics of the student body (N = 409) (%).

<b>Gender</b>	<b>Study Participants</b>	<b>School population</b>
Male	22 (19.1)	85 (21)
Female	92 (80.0)	323 (79)
Non-conforming	1 (0.9)	1 (.003)
Age		N/A
Range	22 - 64	
Mean	29.9 (SD: 5.80)	
Current year		
1 st	24 (20.9)	81 (19.8)
2nd	21 (18.3)	87 (21.3)
3rd	25 (21.7)	85 (20.8)
4th, 5th, or 6th	45 (39.1)	156 (38.1)
Dual enrolled		
No	70 (60.9)	254 (62.1)
Yes	45 (39.1)	155 (37.9)
2nd program (n = 45)		
Chinese Medicine	24 (53.3)	89 (57.4)
Mental Health	7 (15.6)	12 (7.7)
Global Health	2 (4.4)	5 (3.2)
Nutrition	2 (4.4)	23 (14.8)
Research	8 (17.8)	26 (16.8)
Other	2 (4.4)	0 (0.0)
Track		
4-year ND only	39 (33.9)	146 (35.7)
4-year dual	17 (14.8)	37 (9.0)
5-year ND only	34 (29.6)	108 (26.4)
5-year or more dual	25 (21.7)	118 (28.9)
Currently in clinic		N/A
No	45 (39.1)	
Yes	70 (60.9)	
Credit hours		N/A
Range	15 - 38	
Mean	24.3 (SD 4.41)	



**Table 2**

Interpersonal Reactivity Index Mean Scores (and SD) by Subscale. N = 115.

	Perspective taking	Fantasy	Empathic concern	Personal distress
Total	20.09 (4.93)	17.77 (6.34)	21.31 (4.53)	9.92 (5.65)
Gender N = 114 <sup>a</sup>				
Male N = 22	19.68 (4.86)	15.00* (5.75)	19.45* (5.15)	8.95 (5.04)
Female N = 92	20.22 (4.98)	18.39 (6.36)	21.77 (4.30)	10.21 (5.79)
Year in School				
1 <sup>st</sup> N = 24	20.63 (4.76)	19.75 (6.03)	21.67 (3.77)	10.46 (4.74)
2 <sup>nd</sup> N = 21	19.04 (5.86)	17.52 (6.07)	20.52 (4.95)	8.95 (5.83)
3 <sup>rd</sup> N = 25	20.24 (4.51)	16.88 (7.00)	21.64 (4.74)	9.80 (5.20)
4 <sup>th</sup> , 5 <sup>th</sup> , or 6 <sup>th</sup> N = 45	20.20 (4.86)	17.31 (6.23)	21.31 (4.52)	10.16 (6.32)
Dual Enrolled				
No N = 70	19.74 (5.27)	17.94 (6.50)	21.51 (4.27)	9.77 (5.47)
Yes N = 45	20.62 (4.36)	17.49 (6.16)	21.00 (4.94)	10.16 (5.97)
Second program (n = 45)				
Chines Medicine N = 24	20.75 (4.32)	17.08 (6.27)	21.58 (4.73)	10.00 (6.56)
Mental Health N = 7	21.43 (4.27)	19.00 (5.69)	22.57 (2.64)	10.43 (4.82)
Global Health N = 2	23.50 (3.54)	14.00 (5.66)	22.50 (2.12)	4.50 (4.95)
Nutrition N = 2	21.50 (0.71)	21.00 (4.24)	22.00 (7.07)	11.00 (5.66)
Research N = 8	17.75 (4.92)	15.38 (6.35)	16.25 (5.57)	11.13 (6.36)
Other N = 2	24.00 (1.41)	25.50 (2.12)	25.00 (0.00)	12.00 (4.24)
Track				
4-year stand alone N = 39	19.87 (5.57)	18.00 (6.32)	21.18 (4.18)	8.87 (5.49)
4-year dual N = 17	20.65 (5.12)	18.76 (6.06)	20.24 (5.92)	10.76 (5.85)
5-year stand alone N = 34	19.74 (4.95)	18.32 (6.76)	21.88 (4.66)	11.65 (5.26)
5 or more year dual N = 25	20.52 (3.80)	15.96 (5.99)	21.48 (3.89)	8.64 (5.89)
In Clinic				
No N = 45	20.33 (5.50)	19.13 (6.15)	21.49 (4.20)	10.20 (5.09)
Yes N = 70	19.93 (4.56)	16.89 (6.35)	21.20 (4.75)	9.74 (6.00)

<sup>a</sup>The one participant identifying as non-gender conforming was excluded from all analyses involving gender.

\* p value <.05, relative to Female.

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**Table 3**

Maslach Burnout Inventory Mean Scores (and SD) by Subscales. N = 112.

	Emotional Exhaustion	Personal Accomplishment	Depersonalization
Combined	25.92 (11.99)	29.90 (6.36)	6.77 (6.12)
Gender (n = 111) <sup>a</sup>			
Male	25.73 (11.39)	28.64 (6.75)	8.91 (6.98)
Female	25.78 (12.13)	30.25 (6.29)	6.25 (5.85)
Year in School			
1 st	21.17 (10.31)	30.91 (7.08)	4.48 (4.50)
2nd	24.55 (11.29)	27.40 (4.37)	7.00 (5.62)
3rd	27.92 (11.13)	30.28 (5.07)	6.12 (5.44)
4 <sup>th</sup> , 5 <sup>th</sup> , or 6th	27.89* (13.12)	30.30 (7.23)	8.23 (7.12)
Dual Enrolled			
No	23.37 (10.34)	29.94 (6.10)	5.97 (5.05)
Yes	29.86* (13.36)	29.84 (6.81)	8.00 (7.38)
Second program (n = 44)			
Chines Medicine	28.39 (13.80)	30.48 (7.70)	6.65 (5.94)
Mental Health	26.29 (15.42)	29.86 (8.23)	4.71 (6.47)
Global Health	19.50 (0.71)	29.00 (1.41)	3.50 (4.95)
Nutrition	41.50 (9.19)	26.00 (1.41)	10.00 (11.31)
Research	36.00 (9.24)	27.75 (4.37)	14.63 (8.72)
Other	33.50 (20.51)	35.50 (2.12)	11.00 (9.90)
Track			
4-year stand alone	22.05 (10.65)	31.21 (5.91)	6.45 (5.49)
4-year dual	30.41 (14.65)	28.00 (6.03)	9.18 (8.80)
5-year stand alone	26.82 (10.21)	28.72 (5.80)	6.09 (5.43)
5 or more year dual	27.63 (13.17)	30.79 (7.67)	6.50 (5.70)
In Clinic			
No	23.00 (11.24)	29.67 (5.45)	5.58 (4.90)
Yes	27.74* (12.16)	30.04 (6.90)	7.51 (6.71)

<sup>a</sup>The one participant identifying as non-gender conforming was excluded from all analyses involving gender.

\* p < .05, relative to 1<sup>st</sup> year / No.

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**Table 4**

Percentage of students fitting high, medium, or low burnout categories for each subscale of the Maslach Burnout inventory. N = 112.

	Mean	Range	Low	Moderate	High
Emotional Exhaustion	25.92	0–54	(Score: 0–16) 19.6%	(17–26) 38.4%	(27–54) 42.0%
Personal Accomplishment	29.90	0–48	(39–48) 8.9%	(32–38) 26.8%	(0–31) 64.3%
Depersonalization	6.77	0–30	(0–6) 58.9%	(7–12) 22.3%	(13–30) 18.8%

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**Table 5**

Pearson correlations between subscales of the Interpersonal Reactivity Index (IRI) and the Maslach Burnout Inventory (MBI).

	IRI				MBI			
	PT	FS	EC	PD	EE	PA	DP	
IRI	PT	1						
	FS	.177	1					
	EC	.491 <sup>b</sup>	.453 <sup>b</sup>	1				
	PD	-.091	.275 <sup>b</sup>	.137	1			
MBI	EE	-.188 <sup>a</sup>	-.058	-.227 <sup>a</sup>	.330 <sup>b</sup>	1		
	PA	.272 <sup>b</sup>	.126	.235 <sup>a</sup>	-.378 <sup>b</sup>	-.398 <sup>b</sup>	1	
	DP	-.330 <sup>b</sup>	-.173	-.428 <sup>b</sup>	.078	.668 <sup>b</sup>	-.268 <sup>b</sup>	1

IRI = Interpersonal Reactivity Index; MBI = Maslach Burnout Inventory; PT = Perspective Taking; FS = Fantasy; EC = Empathic Concern; PD = Personal Distress; EE = Emotional Exhaustion; PA = Personal Accomplishment; DP = Depersonalization.

<sup>a</sup>Correlation is significant at the .05 level (2-tailed).

<sup>b</sup>Correlation is significant at the .01 level (2-tailed).



**Table 6**

Published Data of Interpersonal Reactivity Index Scores for Comparison.

Author and location of study	Population	Empathic Concern	Perspective Taking
This Study	N = 115; Naturopathic medical students of all years	21.3	20.1
Airagnes et al. [57] France	N = 129; 4 <sup>th</sup> year medical students	18.0	17.1
Stratton et al. [12] <sup>a</sup> Kentucky	N = 166; 3 <sup>rd</sup> year medical students	Men: 19.6 Women: 20.9	Men: 19.9 Women: 19.3
Stratton et al. [58] <sup>a</sup> Kentucky	N = 64; 1 <sup>st</sup> year medical students	Men: 22.0 Women: 23.7	Men: 21.2 Women: 21.0
Paro et al. [38] Brazil	N = 259; 3 <sup>rd</sup> and 4 <sup>th</sup> year medical students	20.3	18.0
Quince et al. [59] UK and New Zealand	N = 652; 1 <sup>st</sup> and 2 <sup>nd</sup> year medical students	21.0	19.1
Davis (developer of the IRI) [2] Texas	N = 1169; undergraduate psychology students	Men: 19.0 Women: 21.7	Men: 16.8 Women: 18.0

<sup>a</sup> Scores were calculated on a 1–5 scale rather than the standard 0–4. The appropriate adjustments were made for consistent reporting here.

**Table 7**

Published Data for Maslach Burnout Inventory for Comparison.

Author and Location	Population	Mean (Burnout criteria is EE	27, DP	13, PA	31)
This Study	N = 112; <b>Naturopathic medical students of all years</b>	<b>EE: 25.9 DP: 6.8 PA: 29.9</b>			
Brazeau et al. [43] New Jersey	N = 124; 4 <sup>th</sup> year medical students	EE: 24.3 DP: 10.2 PA: 36.1			
Pato et al. [38] Brazil	N = 248; 1 <sup>st</sup> and 2 <sup>nd</sup> year medical students	EE: 27.0 DP: 6.9 PA: 33.8			
Krasner et al. [39] New York	N = 60; Physicians in practice	EE: 26.8 DP: 8.4 PA: 40.2			
Studies reporting percentage of their populations who meet burnout criteria:					
This Study	<b>N = 112; Naturopathic medical students of all years</b>	<b>EE: 42.0% DP: 18.8% PA: 64.3%</b>			
Lapinski et al. [60] US (multicenter)	N = 1294; osteopathic medical students	EE: 53.2% DP: 35.6% PA: 73.9%			
Shanafelt et al. [61] Washington	N = 115; medical residents (internal medicine)	EE: 53% DP: 64% PA: 31%			
Dyrbye et al. [62] Minnesota	N = 545; medical students	EE: 34.7% DP: 25.8% PA: 30.8%			

EE = Emotional Exhaustion; DP = Depersonalization; PA = Personal Accomplishment.