

1 **Title:** Medical Students' Awareness About Value-Based Health Care in Brazil: A Cross Sectional Study

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Authors Contribution Statement: Authors Contribution Statement:

Contributor Role	Role Definition	Authors						
		1*	2*	3	4	5	6	7
Conceptualization	Ideas; formulation or evolution of overarching research goals and aims.	X	x			X		X
Data Curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse.	X	X				X	
Formal Analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.							X
Funding Acquisition	Acquisition of the financial support for the project leading to this publication.							
Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.	X	X	X	X	X		X
Methodology	Development or design of methodology; creation of models	X	X	X	X	X		X
Project Administration	Management and coordination responsibility for the research activity planning and execution.	X	X					
Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.					X		X
Software	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.							
Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.	X	X					X
Validation	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.	X	X	X	X			
Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.	X	X	X	X			
Writing – Original Draft Preparation	Creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).	X	X	X	X			
Writing – Review & Editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.	X	X	X	X			X

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Discussion Points:

1. We conducted a pioneer study to quantify VBHC awareness in a medical student population nationwide (Brazil).
2. The survey included over 3,000 responses, representing all states of Brazil across 148 institutions.
3. We found a low level of awareness on the topic and relevant intrinsic and extrinsic factors that can influence the exposure to this important topic in medical education, such as interest in pursuing training and a career MBA in healthcare management.
4. Our results suggest that medical schools have the potential to reinforce both intrinsic and extrinsic factors related to VBHC awareness through education and extracurricular activities) to prepare future doctors to practice in a Value-driven context.

1 **ABSTRACT.**

2

3 **Background:** The rising healthcare costs demand a transition from the current fee-for-service to a Value-Based
4 Health Care (VBHC) Model. This requires all future doctors to understand VBHC. We aimed to evaluate VBHC
5 awareness-level among Brazilian medical students and to identify the associated intrinsic/extrinsic factors.

6 **Methods:** This was a survey based, cross-sectional study, conducted through an online survey applied to
7 students from Brazilian medical schools. A descriptive analysis based on participants' level of awareness about
8 VBHC was performed. The categorical variables included were absolute and relative frequencies using chi
9 square tests. A multivariate binary logistic regression analysis was performed by calculating the odds ratio (OR)
10 and 95% confidence intervals (95%CI), to compare each response according to VBHC awareness.

11 **Results:** We collected 3030 responses, from 148 Medical Schools across all Brazilian states. Medical students
12 were compared in 2 groups; 1 was familiar with VBHC (14%; 426); 2 was not (86%; 2575). The univariate
13 analysis showed that group 1 was more willing to share clinical outcomes/costs data related to their practice
14 (57.04%) compared to 2 (48.12%). The multivariate analysis showed that internship experience was the most
15 relevant factor associated with VBHC exposure (OR 4.32 [CI 95% 1.82 - 10.24]).

16 **Conclusion:** We found that few medical students understand VBHC concepts, and that exposure was due to
17 self-education efforts. Our results suggest that medical schools have the potential to reinforce both intrinsic and
18 extrinsic factors related to VBHC knowledge to prepare future doctors to practice in a value-driven context.

19

20 **Key Words:** Delivery of Health Care, Health Care Costs, Medical Students, Brazil

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1 INTRODUCTION.

2
3 Every year, health care costs increase significantly, representing more than 10% of the world's Gross Domestic
4 Product (GDP).¹ In the United States 17.07% of the GDP is spent on health, while in Brazil the rate is 11.77%.¹
5 However, spending more does not necessarily mean better quality of health. This dissonance between costs
6 and quality is mainly the result of the current payment model, fee-for-service, which stimulates volume of
7 services over outcomes achieved.² In 2006, Porter and Teisberg coined the term value-based health care to
8 refer to a strategy aimed at restructuring health care systems and maximizing value for patients. In this
9 proposal, value is the relationship between the outcomes that matter to patients over the costs to achieve these
10 outcomes.³

11
12 In Latin America, there are only a few initiatives to implement Value-Based Health Care Models.⁵⁻⁷ These
13 initiatives are necessary to foster the transition from the current flawed model towards one focused on health
14 promotion and outcomes achieved and demand the timely inclusion of this topic in medical training programs.^{7,8}
15 In order to advance with VBHC implementation, it is key to educate all healthcare stakeholders. An analysis of
16 255 citations of 12 VBHC trend-starting articles pointed that although the VBHC discussion is spreading through
17 medical journals, a significant proportion of the publications miss the exact understanding of the aspect they
18 are discussing or referring to and the authors conclude that a diffusion of shallow knowledge is underway.⁹ In
19 Brazil, a survey conducted in a private nonprofit organization, Makdisse M et al demonstrated that the level of
20 awareness on VBHC is still low among physicians with only 27% percent of them referring to being familiar with
21 the VBHC concepts.¹⁰ Of note, among physicians in executive roles, the rate was 80%.¹⁰

22
23 An effective way to increase the awareness among healthcare professionals would be to include VBHC in the
24 curriculum of medical and other health undergraduate programs. A first step could be to understand the current
25 context and degree of familiarity of medical students on VBHC core concepts and to our knowledge, there is no
26 published study that assesses the degree of awareness of future doctors on value-based care. Therefore, the
27 aim of this study was to capture the degree of awareness among Brazilian medical students about VBHC and
28 to correlate the intrinsic and extrinsic factors with VBHC exposure. We hypothesize that this awareness is still
29 low, especially due to the recent discussion of the topic and its absence in the formal medical school curriculum.
30 In this way, beyond spreading the Value concepts, we may establish a baseline level of VBHC awareness and
31 compare with post intervention assessments.

1 METHODS

2
3 This was a cross-sectional study, based on an electronic survey applied to medical students from 148 Brazilian
4 medical schools, located in the five Brazilian regions, including both public and private schools.

5
6 The eligibility criteria consisted of medical students enrolled in Brazilian medical schools between January 2019
7 to December 2020 and who signed an electronic consent form. The selection method was online based, with
8 the survey sent through social media, email and WhatsApp with no paid advertisements. The survey was open
9 from November 2019 to June 2020. In order to prevent selection bias, we advertised the survey beyond the
10 direct connections of the authors. We contacted student organizations from universities from all states of Brazil
11 to help us in advertisement. Due to the exploratory nature of this study, the sample size was not calculated.
12 This study was approved by the ethical committee from Universidade Passo Fundo (Brazil) with the reference
13 number 3.681.791 and received no funding.

14
15 The survey questions (**Appendix 1**) were developed based on similar study adapted to the Brazilian context.¹¹
16 The primary endpoint was to determine the self-reported level of awareness on Value-Based Health Care
17 among medical students. Secondary endpoint were to assess intrinsic and extrinsic factors related to this level
18 of awareness. Intrinsic factors were: age, gender, previous college degree obtained, medical area of interest,
19 interest in pursuing academic programs other than medical school, participation in extracurricular activities,
20 interests beyond the medical field. Extrinsic factors included medical school year, university name (its location,
21 whether management and health systems classes were included in the curriculum, teaching methodology,
22 existence of health management/health consulting club).

23
24 To compare students regarding their level of awareness on VBHC, answers to the question 6 (How do you rate
25 your degree of familiarity with the topic "Value-Based Healthcare"?) on the online survey were transformed into
26 binary variables, where "yes" (high level of awareness on VBHC) was considered if options "a, b or c" had been
27 selected, and no (low level of awareness on VBHC) for all of the others (See questionnaire in the Appendix 1),
28 in order to make groups more homogeneous and to reduce the degrees of freedom of the variables.

29
30 A descriptive analysis based on participants' level of awareness about VBHC was performed. The continuous
31 variables included were mean, standard deviation, median and interquartile range. The normality assumptions
32 were tested a priori. When normality assumptions were met, t tests were performed, if not, non-parametric tests
33 (Mann-Whitney U or Kruskal-Wallis) were used.

34
35 The categorical variables included were absolute and relative frequencies using chi square tests. A multivariate
36 binary logistic regression analysis was performed by calculating the odds ratio (OR) and 95% confidence
37 intervals (95%CI), to compare each response according to VBHC awareness.

38
39 The software used for statistical analysis was R version 3.6.0. Statistical significance considered was 5%.

40

1 RESULTS.

3 Descriptive Analysis

4 A total of 3,030 medical students completed the survey, corresponding to 148 institutions, across 24 states of
5 Brazil and the Federal District. Thirty-three responses were not considered in the analysis because either the
6 participant did not sign the consent form or provided incomplete information. Among participants, 63.6% were
7 female and the mean age was 22.6 years old, with a standard deviation of 3.1 years, male respondents with a
8 mean age of 22.7 years and a standard deviation of 3.6 years. Regarding the medical students' profile, 34%
9 were in 1st and 2nd year, 38% in 3rd and 4th year and 28% in 5th and 6th year, these last two are equivalent
10 to the rotation years in the United States.

11
12 In **Table 1**, we divided participants in two groups: group 1 consisted of students who declared to be familiar with
13 VBHC (14.19%; 426) and group 2 with those who were not (85.81%; 2575). Overall, 53.91% correctly identified
14 Porter's concept of Value, with no statistical significance between the two groups. However, group 1 was more
15 likely to know Porter's value equation (9.39% vs 0.43%; $p < 0.01$) and to indicate correctly both components of
16 the formula in order, outcomes (14.08% vs 4.97%; $p < 0.01$) and costs (17.37% vs 5.75%; $p < 0.01$). Altogether,
17 only 4.19% of participants got Porter's formula correct. Regarding their future as healthcare professionals, group
18 1 noted that knowing the costs of care would impact their practice (82.63% vs 78.64%; $p = 0.02$) and considered
19 that health outcomes should play a key role in reimbursement for care delivery (49.53% vs 41.51%; $p < 0.01$).
20 Likewise, they were more open to be evaluated and compared to other doctors by patients (32.86% vs 25.36%;
21 $p < 0.01$).

22
23 With respect to intrinsic factors, group 1 was more familiar with payment models (global budget [55.87% vs
24 42.6%], fee-for-service [57.04% vs 49.28%], bundles [23.24% vs 12.58%] and pay-for-performance [19.01% vs
25 9.55%], all $p < 0.01$). The same students were more likely to have completed another undergraduate course
26 before medical school (7.04% vs 4.66%; $p = 0.02$) and to participate in student organizations (34.74% vs 27.11%;
27 $p < 0.01$), NGOs (13.85% vs 8.04%; $p < 0.01$) or Junior Enterprises (5.4% vs 1.24%; $p < 0.01$). Moreover, they
28 intended to follow careers in management (11.74% vs 6.06%; $p < 0.01$) and pursue a Master in Business
29 Administration (MBA) in the future (19.95% vs 8.47%; $p < 0.01$). Finally, they showed more interests in fields
30 others than medical practice, such as innovation (43.66% vs 35.69%; $p < 0.01$), research (52.82% vs 46.87%;
31 $p = 0.01$), patient safety (36.62% vs 27.07%; $p < 0.01$), health economics (31.46% vs 19.26%; $p < 0.01$) and health
32 policy (36.38% vs 26.06%; $p < 0.01$).

33
34 In regards to teaching methodology, students familiar with VBHC were more often taught through active learning
35 methodologies (Problem-Based Learning [11.5% vs 10.83%;] and Team-Based Learning [10.33% vs 5.67%];
36 $p < 0.01$). Similarly, those aware of VBHC were more often required to attend a mandatory healthcare
37 management course (39.91% vs 28.82%; $p < 0.01$) where payment models were debated (15.02% vs 8.04%;
38 $p < 0.01$) and were also more likely to attend optional management lectures (47.89% vs 23.82%; $p < 0.01$) and
39 participate in Junior Enterprises (10.56% vs 5.01%; $p < 0.01$).

1 **Multivariate Analysis**

2 The multivariate analysis presented in **Table 2** showed that the most frequent way of contact with VBHC
3 concepts cited by respondents was through internships (OR 4.32, 95%CI 1.82 - 10.24). We hypothesize that
4 students who seek out job opportunities during medical school are more inclined to actively learn by themselves
5 and to get updated on market trends. Similarly, group 1 was more likely to know Porter's Value Formula (OR
6 6.95, 95%CI 1.74 - 27.9) and to recognize the importance of discussing clinical outcomes during medical school
7 (OR 20.83, 95%CI 1.59 - 272.11). We recognize that future studies are necessary to investigate whether
8 extrinsic factors could increase VBHC awareness. In this study, medical school classes could not be considered
9 the source of VBHC exposure (OR 1.44, 95%CI 0.83 - 2.5). Likewise, the discussion of payment systems in
10 medical school curricula was not significantly correlated to VBHC knowledge (OR 1, 95%CI 0.29-3.42).

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1 DISCUSSION.

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3 In this study, only 14.19% (426) of the assessed population was found to be familiar with VBHC concepts, a
4 rather small percentage of students, considering the implications of this sample representing part of the future
5 healthcare workforce in Brazil. We have not found any previous studies that analyzed the familiarity of medical
6 students with VBHC. When compared to doctors in a top tier non-profit hospital in Brazil, this number is also
7 small (14.19% vs 27%).¹⁰ This result suggests that most doctors don't know VBHC concepts and, when they
8 are familiar with them, the exposure happens mostly after they graduate from medical school. Although it is
9 recognized that VBHC is essential to prepare doctors for 21st century medical practice, there are still several
10 barriers that delay this aspect of education.¹² Therefore, we stand the hypothesis that VBHC concepts are
11 unknown by most of the future and present medical workforce in Brazil.

12
13 The medical students who declared to be familiar with VBHC share specific intrinsic and extrinsic traits. Some
14 characteristics depend mostly on the medical school, such as the existence of a mandatory Health Management
15 course, which increases the likelihood of a student being familiar with VBHC concepts (39.91% vs 28.82%).
16 Less than half of the students that declared that they had a mandatory management discipline were familiar
17 with VBHC, which points out that this concept is still not well worked out in medical schools. The existence of a
18 Healthcare Systems discipline, present in more than 90% of the Brazilian medical schools reported, did not
19 increase the likelihood of familiarity with VBHC.

20
21 In the United States, despite the effort to include VBHC in the undergraduate medical education through Health
22 Systems Sciences, the VBHC curricula remains nonuniform, varying from multi-year activities during medical
23 school to brief didactic sessions during clerkships.¹³ In a recent survey in the US, clerkship directors cited a lack
24 of generalizable curricular materials and local faculty expertise as main barriers to implementing VBHC
25 education.¹⁴ In order to address these challenges, Dell Medical School at University of Texas in Austin has
26 incorporated VBHC into the undergraduate curriculum. Throughout the four years of training, students are
27 introduced to the core concepts of VBHC and they experiment VBHC-in-practice during their clinical rotations
28 in UT Health Austin's affiliated clinics that have implemented Integrated Practice Units for different medical
29 conditions. Through a partnership with the Value Institute for Health and Care, third-year medical students are
30 also offered the opportunity to participate in a dual degree program including the Master of Science in Health
31 Care Transformation, which equips health care professionals to lead change, catalyze transformation and
32 create high-value services in their field. Students can also access the open-online interactive modules called
33 'Discovering VBHC', aimed at teaching the foundations of VBHC to different types of health professionals and
34 also can be accessed and incorporated independently across diverse educational settings.¹⁴

35
36 Other two examples of VBHC curriculum implementation are The Mayo Clinic Alix School of Medicine
37 (MCASOM) and Harvard Medical School (HMS). MCASOM developed a program whose objective is "to ensure
38 that graduating medical students enter residency prepared to train and eventually practice within person-
39 centered, community- and population-oriented, science-driven, collaborative care teams delivering high-value
40 care." This objective is being pursued through a 4-week course distributed throughout 4 years of medical school.
41 The course is organized around 6 domains, one of them is the High Value Domain, which focuses on three

1 main desired outcomes: applying scientific literature in patient care; improving the system; and balancing quality
2 and cost in patient care.¹⁵ In HMS, students take two 4-week courses. The first one, applied during the first year
3 of medical school, covers foundational topics in clinical epidemiology and population health, health policy, social
4 medicine and medical ethics. The second (after a minimum of 12 months of clinical rotations) includes advanced
5 topics in these disciplines and it is taken in collaboration with Harvard Business School (HBS), using the case
6 method, with which they provide detailed information about a single organization to focus in-class discussions
7 around key elements of VBHC.¹⁵

8
9 Furthermore, a significant proportion of the students familiar with VBHC concepts share intrinsic traits, partially
10 dependent from medical schools. Interest in following a career in management and a desire to pursue an MBA
11 almost doubles the likelihood of a student being familiar with VBHC 11.74% vs 6.06% and 19.95% vs 8.47%
12 respectively. Moreover, engagement in extracurricular activities exposes students to VBHC concepts and
13 increases students' awareness of VBHC concepts (16.16% vs 11.74%) which demonstrates that this knowledge
14 is still mostly reserved to the students open to seek knowledge outside the medical school education. Therefore,
15 medical schools interested in promoting VBHC knowledge among their students are more likely to achieve this
16 objective not only through required VBHC curricula, but also promoting extracurricular activities. According to
17 the multivariate analysis presented in **Table 2**, we found that the most frequent way of respondents contact with
18 VBHC concepts was through internships. Although this result may seem to minimize the effect of intrinsic factors
19 on VBHC knowledge, we believe that successful strategies need to mix both intrinsic and extrinsic factors.

20
21 We believe that familiarity with VBHC concepts is correlated to future professional decisions. Based on the
22 survey, there is a correlation between being familiar with VBHC and accepting to have outcomes and costs
23 monitored and compared to peers' data. Also, students familiar with value-based health care are more prone
24 to accept being paid according to outcomes and to be ranked by patients. Therefore, exposing medical students
25 to the concepts of VBHC early in their careers might facilitate future attempts on the implementation of the value
26 agenda.

27
28 The limitations of this study include the inherent factors of a cross sectional study with voluntary participants,
29 the uneven distribution of responses in the country and the absence of a validated questionnaire. Although we
30 had a representative sample including participants from all states of Brazil, most (86%) of the responses were
31 from southern and southeastern universities, which correspond to the regions where the majority of Brazilian
32 medical schools are located (58%). Furthermore, since all medical schools adhere to a national curriculum
33 under the Brazilian Ministry of Education, we believe that the responses acquired from this study have a
34 relatively high external validity. Another limitation to this study is the absence of a validated questionnaire,
35 including objective measures to evaluate VBHC familiarity, with the exclusive use of the subjective perception
36 of self-awareness about the subject, which can vary widely among survey responders. Furthermore, an active
37 search to analyze curricula of the Brazilian medical schools was not conducted but analyzed indirectly through
38 student's reports.

39
40 One of the purposes of this study is to spread the word on the VBHC strategy among future healthcare
41 professionals in Brazil, which justifies the selection specifically of the Brazilian population of medical students.

1 Future perspectives include the implementation of interventions to promote the learning of VBHC in
2 undergraduate medical education and the international analysis of VBHC familiarity among medical students
3 from several countries.

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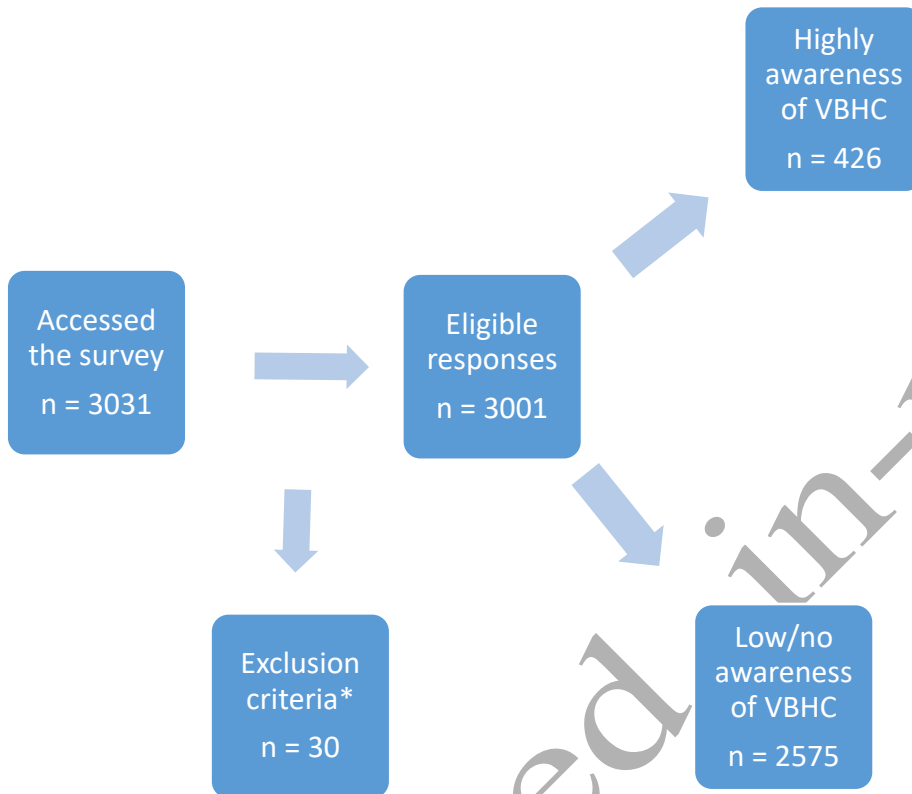
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1 **FIGURES AND TABLES.**

2

3 **Figure 1.** Flowchart of Responses Added to the Study.



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*Excluded responses were due to no consent form signature or absent response on the degree of VBHC awareness.

1 **Table 1.** Students Characteristics and Career Interests According to VBHC Awareness.

Variable	High level of awareness on VBHC (n=426)	Low level of awareness on VBHC (n=2575)	p-value
Gender			
Female	242 (56.81%)	1670 (64.85%)	p <0.01
Male	184 (43.19%)	905 (35.5%)	
Progression in Medical School			
1st year	49 (11.15%)	354 (13.75%)	p=0.29
2nd year	81 (19.01%)	538 (20.89%)	
3rd year	107 (25.12%)	642 (24.93%)	
4th year	67 (15.73%)	323 (12.54%)	
5th year	65 (15.26%)	402 (15.61%)	
6th year	57 (13.38%)	316 (12.27%)	
Does your university have a mandatory healthcare management class?			
Yes	170 (39.91%)	742 (28.82%)	p<0.01
No	100 (23.47%)	627 (24.35%)	
No, but there is an optional	23 (5.4%)	120 (5.47%)	
I don't know	133 (31.22%)	1086 (42.17%)	
Do you have any previous college degree?			
Yes	30 (7.04%)	120 (4.66%)	p=0.02
No	396 (92.96%)	2455 (95.34%)	
What is your medical area of interest?			
Internal Medicine	233 (54.69%)	1514 (58.8%)	p=0.09
Surgery	192 (45.07%)	1138 (44.19%)	p=0.71
Management	50 (11.74%)	156 (6.06%)	p<0.01
Research	73 (17.14%)	349 (13.55%)	p=0.03
Do you have interest in pursuing academic programs other than medical school?			
Residency Program	416 (97.65%)	2539 (98.6%)	p=0.1
Masters /PhD	241 (56.57%)	1400 (54.37%)	p=0.36
MBA	85 (19.95%)	218 (8.47%)	p<0.01
What extracurricular activities have you engaged in?			
Students/Sports Associations	148 (34.74%)	698 (27.11%)	p<0.01
Junior Enterprises	23 (5.4%)	32 (1.24%)	p<0.01
Startups	18 (4.23%)	22 (0.85%)	p<0.01
NGOs	59 (13.85%)	207 (8.04%)	p<0.01
Do you have any interest beyond healthcare?			
Research	225 (52.82%)	1207 (46.87%)	p<0.01
Innovation	186 (43.66%)	919 (35.69%)	p<0.01
Patient Safety	156 (36.62%)	697 (27.07%)	p<0.01
Healthcare Economics	292 (68.54%)	2079 (80.74%)	p<0.01
Artificial Inteligency	132 (30.99%)	500 (19.42%)	p<0.01
Healthcare Policies	155 (36.38%)	671 (26.06%)	p<0.01

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Accepted, in-press

1 **Table 2.** Results of a Multivariate Analysis Used to Determine Which Factors are Associated with High VBHC
2 Awareness Compared to Low VBHC Awareness.

Variable	OR (95%CI)	Respondents (Yes)
Previous exposure to VBHC	12.53 (7.53 - 20.85)	599
Exposure to VBHC through internships	4.32 (1.82 - 10.24)	73
Exposure to VBHC through conferences and lectures	1.71 (0.99 - 2.94)	194
Exposure to VBHC through extracurricular activities	1.62 (0.87 - 3.0)	126
Exposure to VBHC through articles	1.57 (0.67 - 3.71)	66
Exposure to VBHC through medical school classes	1.44 (0.83 - 2.5)	191
Do you know the "Value" formula presented by Porter and Teisberg (2006)?	6.95 (1.74 - 27.9)	51
Do you consider it important to discuss "outcomes" during medical school?	20.83 (1.59-272.11)	2949
Do you consider it important to discuss "costs" during medical school?	0.38 (0.1-1.5)	2907
Do you consider it important to discuss "payment systems" during medical school?	1 (0.29 - 3.42)	2882
Are you aware of any payment system?	0.5 (0.27-0.93)	1908
Do you think that knowing the costs of your medical practice influences how you practice medicine?	1.02 (0.62 - 1.67)	2377
Do you think that knowing the outcomes of your medical practice influences how you practice medicine?	1.22 (0.52 - 2.85)	2795
Would you be willing to have the outcomes and costs of your medical practice monitored and compared to other physicians' performance?	1.1 (0.47 - 2.6)	2901
Would you be willing to share data of the outcomes and costs of your medical practice in order to contribute to reduce costs and improve healthcare quality?	1.45 (0.94 - 2.23)	2737

3
4 *CI=Confidence intervals, OR=odds ratio
5 In bold, we presented the results with significant p values (p <0.05)

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1 **Appendix 1 - Research Instrument.** Online questionnaire sent to medical students.

2

3 **1.Email Address**

4 **2.Informed Consent Form attached**

5 I agree

6 I do not agree (survey ends if this button is clicked)

7

8 **3.I am a medical student with active enrollment in the current semester**

9 Yes

10 No (survey ends if this button is clicked)

11

12 **Awareness of VBHC**

13

14 **4.Have you ever had contact with the subject of Value-Based Healthcare?**

15 Yes

16 No

17

18 **5.If you answered "YES" in the previous question, how did you get in touch? (Open question)**

19 University Lectures

20 Extracurricular activities

21 Internships, professional experiences

22 Scientific Articles

23 Congresses and seminar lectures

24 Electronics (Youtube, TED, Coursera, edX or other platforms)

25 Courses

26 Other:

27

28 **6.How do you rate your degree of familiarity with the topic "Value-Based Healthcare"?**

29 I am enthusiastic about the topic and I try to keep myself updated on initiatives involving VBHC

30 I am familiar with the topic and already read some articles or attended lectures on the topic.

31 I am familiar with the topic but I have never read articles or attended lectures on the topic.

32 I had little contact with the topic and I don't feel comfortable discussing it

33 I never had contact with the topic

34

35 **7.How do you define "Value" in Health?**

36 It is the patient's perception of the benefits obtained from the treatment in relation to the amount paid for it, regardless of the clinical result

38 It is the amount of money paid for a treatment

39 Achieve a high degree of patient satisfaction even if clinical results and costs are outside expected values

40 Clinical results (outcomes that matter to the patient) obtained in relation to the costs to achieve these outcomes

41

42

43 **8.In your opinion, how important should each of the following factors be in defining the remuneration for the medical service?**

44

45

	1 - Irrelevant	2 - Not very important	3 - Important	4 - Very Important	5 - Fundamental
Quantity of services provided					

Time spent in the service					
Complexity of the service					
Outcomes delivered at the end of the service					

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9. When you graduate, you intend to:

- Work as a self-employed physician
- Work as an employee in a fixed institution or practice.
- Act as an employee physician in a fixed institution or practice and maintain some degree of self-employment.
- I do not know.

10. Do you think that knowing the outcomes of your clinical practice influences the way you carry out your clinical practice?

- Yes, knowing the costs influences the way I do my clinical practice.
- No, knowing the costs doesn't change the way I do my clinical practice.
- I do not know.

11. Do you think that knowing the costs related to your clinical practice influences the way you carry out your clinical practice?

- Yes, knowing the costs influences the way I do my clinical practice.
- No, knowing the costs doesn't change the way I do my clinical practice.
- I do not know.

12. Would you be willing to have the outcomes and costs of your clinical practice continuously monitored and compared to the performance of other physicians?

- Not willing
- Willing if there was clarity of individual benefit
- Willing if there was clarity of collective benefit
- Willing if data were anonymous

13. Would you be willing to share data related to the outcomes (outcomes) and costs of your clinical practice for the benefit of cost reduction and improvement in the quality of healthcare?

- Not willing
- Willing if there was clarity of individual benefit
- Willing if there was clarity of collective benefit
- Willing if data were anonymous

14. Would you be willing to be evaluated and ranked against other physicians by patients?

- Not willing
- Willing
- Willing if data were not released to the public
- Willing if there was a way to assess extreme opinions before release it to the public

15. Do you know the formula that defines "Value" developed by Porter and Teisberg (2006)?

- Yes

1 No
2
3
4

16. Check the components of Porter's "Value" formula, which defines the Value-Based Healthcare components:

	Numerator (check one)	Denominator (check one)
Cost		
Price		
Outcomes		
Satisfaction		
Expectation		
Benefits		
I do not know		

5
6 17. How important do you think it is to discuss Outcomes, Costs, Compensation Systems and Value-Based Health
7 Care (VBHC) during graduation?
8
9

	1 - Irrelevant	2 - Not very important	3 - Important	4 - Very Important	5 - Fundamental
Outcomes					
Costs					
Payment systems					
VBHC					

10
11 18. Are you familiar with the functioning of the different compensations models for health services practiced in
12 Brazil? Check all that you think are familiar.

13 -Payment by global budget: The hospital receives a fixed annual fee, generally based on the history of the volume of care
14 and the complexity of the services offered. This model predominates in public hospitals. The model may include penalties
15 (deductions) based on pre-agreed indicators.

16 -Payment by global adjusted budget: Similar to the item above, but includes the possibility of period adjustments,
17 generally every 3 or 4 months, based on volume, complexity and pre-agreed indicators that define a penalty or bonus.,

18 -Payment for service - "open account" (Fee-for-service): The provider (hospital, laboratory or doctor) receives for each
19 service provided, regardless of the result obtained with the treatment.,

1 **-Payment for care - "procedure packages" or "managed procedures" (Fee-for-service):** The provider (hospital,
2 laboratory or doctor) receives per a package that includes services directly linked to the care provided and excludes other
3 care that may be provided due to complications or complications. These extra items are charged "Out of the package"

4 **-Payment for care - "inpatient global per diem" (Fee-for-service):** The hospital receives a single fee for a set of services
5 negotiated between the parties, which includes daily rates, most nursing procedures, gas therapy, use of equipment, etc.,

6 **-Episode Bundles:** The provider receives a single fee per episode of care, including diagnostic evaluation, hospitalization
7 for the performance of procedures and the post-discharge period, including guaranteeing coverage of complications related
8 to the procedure for a predetermined period and performance guarantee that may generate bonuses or penalties based on
9 pre-defined indicators.,

10 **-Payment by Related Diagnostic Groups (DRG or similar):** The provider receives based on the classification of each
11 case by diagnostic grouping. The DRG gives a different weight according to a set of clinical conditions and procedures
12 performed. Ex: A patient who is hospitalized with a myocardial infarction and has diabetes and kidney failure has a lower
13 weight than a patient without the last 2 conditions, therefore, the remuneration of the first will be higher.

14 **-Payment per Capitation:** O provider receives a defined value for each registered person assigned to it, for a period of
15 time, regardless of the services that will be used by each person.,

16 **-Payment for Performance, P4P:** The provider receives remuneration according to the performance presented in the pre-
17 defined indicators. Ex: P4P for Diabetes: A basal remuneration is defined and a bonus will be assigned according to the
18 number of patients with glycated hemoglobin < 7.

19 **-I am not familiar with any of the compensation models.**

20
21 **Student and University Profile**

22
23 **19.What is your full name?**

24 **20.How old are you in years?**

25 **21.What is your gender?**

26 Male

27 Female

28 Others

29
30 **22.Where do you study medicine (University and Local)? Ex: USP - Ribeirão Preto/SP**

31 **23.What year of college are you in? Write in years, between 1-6**

32 **24.What is your registration number?**

33 **25.Does your college have any mandatory subject in Health Management?**

34 Yes

35 No

36 No, but it has an optional class

37 I do not know

38
39 **26.If you answered "YES" in the previous question: Throughout this mandatory subject of Health Management, is
40 the theme of Health Compensation Systems discussed?**

41 Yes

42 No

43 I do not know

44
45 **27.Does your college usually offer lectures, symposia or other complementary training on Health Management
46 topics?**

47 Yes

48 No

49 I do not know

50
51 **28.During graduation at your university, does any chair discuss Health Systems? (SUS, NHS...)**

52 Yes

53 No

- 1 I do not know
2
3 **29. Does your university have an Academic Club of Health Management?**
4 Yes
5 No
6 I do not know
7
8 **30. Does your university have a Junior Medical Enterprise?**
9 Yes
10 No
11 I do not know
12
13 **31. What is your university's teaching methodology?**
14 Traditional
15 Problem-Based Learning
16 Team-Based Learning
17
18 **32. Did you complete another undergraduate degree before medicine? If the answer is "YES", which one(s)?**
19 Open question
20
21 **33. What areas do you intend to pursue in medicine?**
22 Clinical
23 Surgery
24 Management
25 Research
26 Radiology
27 I do not know
28
29 **34. What training do you intend to do in addition to a medical degree?**
30 Residency
31 Master's/Doctorate
32 MBA
33 I do not intend to carry out any of these
34
35 **35. Do you participate or have participated in any extracurricular activities? Which ones?**
36 Academic Clubs
37 Academic, Athletic Center/Directory
38 AEMED, DENEM, IFMSA, COUNCILS, UNIONS
39 Junior enterprises
40 Startup
41 NGOs
42 I do not participate in any extracurricular activities
43
44 **36. Do you have any interests other than medical care?**
45 Research
46 Innovation
47 Patient safety
48 Quality
49 Health Economics
50 Artificial intelligence
51 Health policies
52 No interest beyond medical care