



Health-Care Students' Perception on the Role and Contribution of Pharmacists: A Case Study in Ghana

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Authors' contributions

This work was carried out in collaboration among all authors. Author AAA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors MOA and AFAM managed the analyses of the study. Author MOA managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i25A31453

Editor(s):

(1) Dr. Giulio Tarro, Foundation T. & L. de Beaumont Bonelli for cancer Research, Italy.

Reviewers:

(1) Gilberto Bastidas, University of Carabobo, Venezuela.

(2) Mor Nuriel, Israel.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/66937>

Original Research Article

Received 10 February 2021

Accepted 14 April 2021

Published 20 April 2021

ABSTRACT

Objective: The objective of this study was to access the perception of non-pharmacy health-care students on the role and contribution of pharmacists in to health-care delivery in Ghana. Furthermore, the influence of factors such as sex, program of study and frequency of interaction with pharmacists on this perception was determined.

Methods: A structured questionnaire was designed and administered to 670 medical, optometry and nursing students of the University of Cape Coast, Ghana after a pilot study was conducted.

Results: The students strongly agreed that the role of the pharmacist is dispensing drugs, collaborating with physicians to prescribe medications. The students also appreciated the contribution of pharmacists in helping to reduce adverse reactions to medications. The students, however, showed little appreciation of pharmacists carrying out research or physical examinations and helping to reduce cost to patients. There was no effect of sex on the perception of students, although the frequency of interaction with pharmacists influenced their perceptions

Conclusions: The results of this study indicate that non-pharmacy health students appreciate certain roles and contributions of pharmacists to health-care.

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Keywords: Perception; pharmacist; health-care; students.

1. INTRODUCTION

In most developing countries, pharmacists are less appreciated and recognized for the roles they play in the health-care system [1-2]. Pharmacists are among the most underutilized and under-recognized health-care professionals. Indeed, in some countries, the role of pharmacists is not considered essential by other health-care professionals and the community [1-2].

In Ghana, not many are familiar and understand the roles of pharmacists beyond the dispensing of drugs [3-5]. This poor perception about the role of pharmacists can be attributed to factors such as a poor pharmacist-to-patient ratio [3,6], the presence of over-the-counter medicine sellers [7-8], and lack of proper means of identifying pharmacists within health facilities [3-5,9]. Indeed, in the hospital setting, the responsibilities of pharmacists are obscured within the pharmacy and patients may not even interact with a pharmacist [10]. These factors have created a predominant belief that the major contribution of pharmacists to health-care is medication distribution [2].

In developing countries, however, the role of pharmacists, continues to evolve due to innovations in health-care delivery such as direct patient care and disease management services [11]. The pharmacist, besides the role of reading prescriptions and serving medications, is expected to be part of the patient-care team which aims to monitor and maximize patient's response to medication [12]. The pharmacist is also expected to advise physicians, and other health-care professionals with regard to the proper use of medication [13].

The changing face of health-care means that students need to be trained to appreciate the role of other health-care workers since that will enhance working together as a team during collaborative practice. Limited information, however, exists about the perception of health-care students on the role and contribution of pharmacist to health-care in Ghana. In this regard, understanding the perception of future health-care workers on the role of pharmacists is important in promoting successful inter-professional relationships and collaborative practice. The objective of this work was, therefore, to assess the role of pharmacists in

health-care delivery as perceived by non-pharmacy health-care students and to determine how factors such as sex, program of study and frequency of interaction with pharmacists influence the perception the students have about the role and contribution of pharmacists to health-care delivery.

2. MATERIALS AND METHODS

2.1 Study Location and Population

This study was carried out in the College of Health and Allied Sciences of the University of Cape Coast (UCC), Cape Coast in the Central Region of Ghana. The College consists of three schools: School of Medical Sciences, School of Nursing and Midwifery, and School of Allied Health Sciences. All the three schools within the college are located in the north campus of the University of Cape Coast.

This study involved representative students selected from three programs within the college. Medical students were selected from the School of Medical Sciences, nursing students were selected from the School of Nursing and Midwifery, and optometry students were selected from the School of Allied Health Sciences. These students were selected due to the fact they are most likely to interact frequently with pharmacists in the course of their future careers through prescribing and administering medications. All students within the three selected programs were included in the study while students who refused to take part in the study were excluded. As many students within the three selected programs were invited to partake in the study.

2.2 Data Collection

Data was collected by administering a self-developed structured questionnaire to the students, after seeking informed consent. No prior baseline information on students was sort before administering the questionnaires. Students were assured of confidentiality and voluntariness of enrolling in the study. The questionnaire was, however, pre-tested using 12 students from each program. After piloting and making the appropriate changes the questionnaires were administered accordingly.

The questionnaire consisted of two main parts: a) Basic demographic information including sex,

program of study, duration of study and frequency of interaction with pharmacists b) Questions on the role of pharmacists and the contribution of pharmacist to health-care. These questions were answered based on a five-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree). All questionnaires were administered between 3rd to 28th February 2020. The purpose and objectives of the study was explained to the students before administering the questionnaires.

2.3 Data Analysis

The collected data were checked for completeness and entered into Microsoft Excel for analysis in IBM Statistical Package for Social Sciences, SPSS 20 (Armonk, New York). The Likert scale was converted to numerical values for the purpose of statistical analysis. The average and standard deviations of the responses were estimated and presented as results. An average response of greater than 4.5 was considered as strongly agreeing to a given question while an average response of 4.0-4.5 was considered agreeing to the question. Average response of less than 4.0 was considered showing little agreement to a set question.

Statistical testing was carried using students' t-test and analysis of variance (ANOVA). Post-hoc analysis using the Tukey test was carried out after ANOVA when a significance difference was observed. All statistical analyses were carried out at a significant p of 0.05.

3. RESULTS

3.1 Basic Demographics and Overall Response

A total of 670 participants enrolled in the study, representing 38.81%, 27.16% and 34.03% of students from nursing, medicine and optometry, respectively (Table 1). A response rate of more than 50% was achieved with most of the participants being male students (54.17%). The highest number of participants were first and second-year (Level 100 and 200) students.

The students strongly agreed that the role of the pharmacist is dispensing drugs and collaborating with physicians to prescribe medications as well as the contribution of pharmacists in helping to reduce adverse reactions to medications (Table

2). The students, however, showed little agreement that pharmacists should carry out research or carry out physical examinations. The students also showed little agreement that pharmacists help reduce cost to patients as well as help create a cost-effective health-care system. No significant effect of sex on any of the responses was observed (Table 2).

3.2 Frequency of Interaction with Pharmacists and Student's Perception on the Role of the Pharmacist

Only 3.43% of students had daily interaction with a pharmacist while 11.50% interacted weekly with a pharmacist (Table 1). Generally, the frequency of interaction with pharmacists increased as students progressed within a program of study. The highest interaction with a pharmacist was observed for level 400 nursing and level 500 medical students (Table 1).

Significant differences were observed between the response of the different groups, showing the degree to which, these groups perceive the role of pharmacists (Table 3). There was a reduction in the number of students who agreed that the pharmacist role is helping patients adhere to medications. Furthermore, students who interacted daily with pharmacists agreed that pharmacists perform this role, while students who interacted monthly and yearly showed little agreement. A similar observation was also made with respect to the contribution of pharmacist in helping to reduce cost to patients and helping create a cost-effective health-care system as shown in Table 3.

3.3 Program of Study and Its Influence on the Perception of Students on the Role of Pharmacists

The effect of the different programs of study on the perception of students about the role and contribution of pharmacists to healthcare is shown in Table 4. No significant difference was observed between the response of the different groups concerning pharmacists performing roles such as carrying out research, recommending medication to physicians, recommending medications based on symptoms of patients and carrying out physical examinations. However, with the exception of pharmacists carrying out research and carrying out physical examinations, the different groups all agreed to pharmacist performing the above mentioned roles.

Table 1. Basic demographics of participants who took part in the study

Program and Level	Total	Sex (%)		Frequency of Interaction with Pharmacists (%)			
		Male	Female	Daily	Weekly	Monthly	Yearly
Nursing							
100	77	37.66	62.33	-	-	50.65	49.35
200	50	44.00	56.00	-	-	50.00	50.00
300	58	70.69	29.31	-	-	56.90	43.10
400	75	38.67	61.33	22.67	77.33	-	-
Medical							
100	33	57.58	42.42	-	-	45.45	54.55
200	52	46.15	53.85	-	-	55.77	44.23
300	47	48.94	51.06	-	-	61.70	38.30
400	25	64.00	36.00	-	-	60.00	40.00
500	25	60.00	40.00	24.00	76.00	-	-
Optometry							
100	49	61.22	38.78	-	-	55.10	44.90
200	57	63.16	36.84	-	-	50.88	49.12
300	37	67.57	32.43	-	-	64.86	35.14
400	44	63.64	36.36	-	-	65.91	34.09
500	29	65.52	34.48	-	-	55.17	44.83
600	12	58.33	41.67	-	-	66.67	33.33

With respect to contributions to health-care, no significant difference was observed between the different groups with regards to pharmacist being essential to health-care delivery, or helping to reduce cost to patients. Although significant differences were observed in the other responses, all these responses were within a similar range of agreement. The only exception where an observed significant difference resulted in a difference in agreement was the response to pharmacist helping patients adhere to medications. While nursing and medical students agreed to these roles, optometry students thought otherwise.

4. DISCUSSION

In this study, it was observed that the students agreed with some clinical role of pharmacists such as dispensing drugs, recommending over-the-counter products, prescribing medications in collaboration with physicians, monitoring drug therapy and making dosage adjustments. The students, however, did not agree with pharmacists carrying out research, administering immunizations, or carrying out physical examinations. This observation is similar to that reported in a similar study involving only medical students [11].

The response on the contribution of pharmacist to health-care was positive, although the students did not agree that pharmacist helps reduce cost to patients or helps create a cost-effective health-care system. This perception is divergent to the critical role pharmacists perform to help reduce cost to patients and the health-care system by recommending generic and much cheaper but effective medications and optimizing medication therapy by addressing medication related problems which contributes to shorter hospital stay [14-15].

A major theme observed in this study was the perception of the primary role of the pharmacist in dispensing drugs, and prescribing drugs in conjunction with a physician. These two roles received the highest response of 4.69 (dispensing of drug) and 4.71 (prescribe drugs in conjunction with a physician). Indeed, these perceptions was reported in a similar study involving non-pharmacy students where more than 90% of respondents agreed that pharmacists can dispense drugs but only 20% agreed that pharmacists can prescribe drugs [16].

The role of the pharmacist in carrying out research had the lowest average response of 3.34, compared to the other roles outlined in this study. This response is contrary to that observed

in another study where carrying out research had the highest average response [11]. This shows that the students need to be educated on the evolving role of pharmacists in health-care delivery beyond the role of drug dispensing.

The students did not agree with pharmacists carrying out physical examinations. Carrying out physical examinations have long been associated with the primary role of physicians [17]. However, with the need to expand access to health-care, pharmacists are being called upon and trained to be able to identify and interpret certain basic symptoms. Also, with the advancing nature of retail pharmacy, pharmacists are now required to be able to perform basic diagnostic services such as rapid test for malaria, blood pressure, cholesterol, and blood glucose levels [1,16].

There was no effect of participant's sex on the role of pharmacists or the contribution of pharmacists to health-care. The frequency of interaction with pharmacists was observed to play a role in the perception of the student. Students who interacted frequently with pharmacists had a positive outlook about the role and contribution of pharmacists to health-care as also observed in other studies [11].

The influence of the program of study on the perception of the role of pharmacist was mainly reflected in the degree to which the students agreed to the role of pharmacists. However, within the same program of study, the level of study influenced the perception about the role of pharmacists. This was expected considering that as students' progress within a program of study, they are required to undergo clinical rotations, thus possibly increasing the frequency of interaction with pharmacists. For instance, Level 400 nursing students who have an average weekly interaction with pharmacists had a positive attitude towards the role and contribution of pharmacists to health-care compared to levels 100-300 students who on the average interacted monthly with a pharmacist.

Considering the three programs of study, it was observed that for nursing students, their perception about the role of pharmacist generally improved with the progression of study. This was followed by medical and optometry students. Indeed, for optometry students, the perception about the role of pharmacists was about the same, irrespective of the level of study. This is reflected in their low (monthly) frequency of interaction with pharmacists irrespective of their level of study.

Table 2. Overall response and effect of sex on the perception about the role and contribution of pharmacists to health-care

	Overall	Sex		p
		Male	Female	
Role of pharmacists				
Dispensing drugs	4.69 (0.55)	4.76 (0.55)	4.70 (0.56)	0.69
Monitor drug therapy	4.44 (0.62)	4.45 (0.61)	4.42 (0.63)	0.56
Recommend over the counter medicine	4.40 (0.72)	4.40 (0.74)	4.41 (0.69)	0.89
Collaborate with physicians to prescribe medicine	4.71 (0.62)	4.72 (0.59)	4.70 (0.65)	0.66
Recommend medications to physicians	4.39 (0.49)	4.39 (0.49)	4.39 (0.49)	0.96
Carry out immunizations	4.22 (0.75)	4.21 (0.76)	4.24 (0.74)	0.62
Recommend medicine based on symptoms of patients	4.37(0.48)	4.36 (0.48)	4.37 (0.48)	0.91
Carry out research	3.34 (0.56)	3.32 (0.55)	3.37 (0.58)	0.24
Make changes to prescribed dosages	4.34 (0.57)	4.34 (0.57)	4.33 (0.57)	0.83
Carrying out physical examination	3.69 (0.70)	3.65 (0.72)	3.73 (0.68)	0.16
Contribution of pharmacists to health-care				
Experts of medicine and drugs	4.51 (0.71)	4.49 (0.73)	4.54 (0.68)	0.39
Help improve health of patients	4.58 (0.66)	4.58 (0.64)	4.58 (0.68)	0.93
Help patients adhere to medications	4.03 (0.69)	4.05 (0.69)	4.01 (0.68)	0.45
Help reduce adverse reactions to drugs	4.73 (0.49)	4.74 (0.49)	4.73 (0.50)	0.70
Help reduce cost to patient	3.51 (1.37)	3.47 (1.36)	3.56 (1.38)	0.40
Help create a cost-effective health-care system	3.79 (1.10)	3.77 (1.09)	3.82 (1.11)	0.56
Essential to health-care delivery	4.45 (0.96)	4.41 (1.01)	4.50 (0.91)	0.22

Table 3. The effect of frequency of interaction with pharmacists on the perception about the role and contribution of pharmacists to health-care

	Daily	Weekly	Monthly	Yearly	p
Role of pharmacist					
Dispensing drugs	4.74 (0.45)	4.81 (0.40)	4.67 (0.43)	4.67 (0.68)	0.24
Monitor drug therapy	4.30 (0.47)	4.57 (0.50)	4.66 (0.49)	4.13 (0.68)	0.00
Recommend over the counter medicine	4.43 (0.51)	4.45 (0.50)	4.22 (0.42)	4.61 (0.98)	0.00
Collaborate with physicians to prescribe medicine	4.74 (0.45)	4.81 (0.40)	4.69 (0.47)	4.72 (0.82)	0.49
Recommend medications to physicians	4.43 (0.51)	4.44 (0.50)	4.00 (0)	4.85 (0.35)	0.00
Carry out immunizations	4.30 (0.47)	4.66 (0.48)	4.65 (0.52)	3.55 (0.57)	0.00
Recommend medicine based on symptoms of patients	4.43 (0.51)	4.44 (0.50)	4.00 (0)	4.80 (0.40)	0.00
Carry out research	3.57 (0.73)	3.29 (0.51)	3.00 (0.06)	3.78 (0.60)	0.00
Make changes to prescribed dosages	4.43 (0.51)	4.44 (0.50)	4.02 (0.12)	4.70 (0.68)	0.00
Carrying out physical examination	4.00 (0)	4.40 (0.49)	3.68 (0.47)	3.45 (0.86)	0.00
Contribution of Pharmacist to health-care					
Experts of medicine and drugs	4.74 (0.45)	4.79 (0.40)	4.40 (0.75)	4.56 (0.71)	0.00
Help improve health of patients	4.74 (0.45)	4.79 (0.41)	4.54 (0.59)	4.55 (0.79)	0.01
Help patients adhere to medications	4.43 (0.51)	4.38 (0.49)	4.03 (0.66)	3.88 (0.74)	0.00
Help reduce adverse reactions to drugs	4.74 (0.45)	4.81 (0.40)	4.71 (0.48)	4.75 (0.53)	0.44
Help reduce cost to patients	4.65 (0.49)	4.47 (0.50)	3.33 (1.34)	3.35 (1.47)	0.00
Help create a cost-effective health-care system	4.43 (0.51)	4.26 (0.59)	3.64 (1.09)	3.79 (1.21)	0.00
Essential to health-care delivery	4.74 (0.45)	4.79 (0.40)	4.28 (1.07)	4.55 (0.92)	0.00

Table 4. Influence of program of study on the perception about the role and contribution of pharmacists to health-care

	Nursing	Medicine	Optometry	p
Role of Pharmacist				
Dispensing drugs	4.58 (0.64)	4.61 (0.59)	4.87 (0.33)	0.00
Monitor drug therapy	4.38 (0.66)	4.40 (0.69)	4.54 (0.50)	0.01
Recommend over the counter medicine	4.33(0.83)	4.35 (0.76)	4.54 (0.50)	0.00
Collaborate with physicians to prescribe medicine	4.62 (0.73)	4.65 (0.68)	4.87 (0.33)	0.00
Recommend medications to physicians	4.38 (0.49)	4.35 (0.48)	4.42 (0.49)	0.41
Carry out immunizations	4.17 (0.77)	4.11 (0.81)	4.38 (0.63)	0.00
Recommend medicine based on symptoms of patients	4.35 (0.48)	4.33 (0.47)	4.42 (0.49)	0.14
Carry out research	3.37 (0.61)	3.31 (0.59)	3.34 (0.47)	0.58
Make changes to prescribed dosages	4.29 (0.61)	4.31 (0.58)	4.42 (0.49)	0.03
Carrying out physical examination	3.72 (0.74)	3.60 (0.76)	3.71 (0.60)	0.17
Contribution of Pharmacist to health-care				
Experts of medicine and drugs	4.45 (0.72)	4.46 (0.71)	4.64 (0.69)	0.01
Help improve health of patients	4.47(0.76)	4.52 (0.69)	4.75 (0.43)	0.00
Help patients adhere to medications	4.12 (0.64)	4.12 (0.66)	3.86 (0.72)	0.00
Help reduce adverse reactions to drugs	4.67 (0.55)	4.66 (0.53)	4.87 (0.33)	0.00
Help reduce cost to patients	3.62 (1.33)	3.38 (1.35)	3.50 (1.42)	0.21
Help create a cost-effective health-care system	3.88 (1.05)	3.62 (1.15)	3.83 (1.10)	0.03
Essential to health-care delivery	4.41 (0.95)	4.44 (0.95)	4.52 (0.98)	0.47

5. CONCLUSIONS

The results of this study indicate that students appreciate certain roles and contributions of pharmacists to health-care such as dispensing drugs and helping to reduce adverse reactions to medications. However, pharmacists carrying out research or physical examinations were not recognized roles by the students. The study also showed that sex did not influence the perception about the role and contributions of pharmacists, although the frequency of interaction with pharmacists influenced their perception. The frequency of interaction with pharmacists was also influenced by the level of study, with students at the higher level of study interacting frequently with pharmacists leading to positive perception about the role of pharmacists.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

ACKNOWLEDGEMENT

The authors wish to thank Bright Quaye for helping in the data collection

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/66937>