

Polypharmacy: Non-Adherence to Medication among Adult

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ABSTRACT

The polypharmacy prevalence among adults, whose age group depicts potential self-neglect as they are more focused on their careers, has been alarming as the increase in the number of drugs taken may result in the rise of medication non-adherence occurrences as well. By determining how polypharmacy contributes to medication non-adherence among adults, the study aims to show its prevalence and relationship that may help address the threat it imposes on public health. A non-experimental, descriptive, correlation design was utilized to obtain data from seventy-seven (77) Liceo de Cagayan University's third-year pharmacy students' biological parents through a survey employing a Google form with twenty-eight (28) questions derived from ARMS and PATD questionnaire. Frequency count, percentage, mean, standard deviation of variables, and inferential statistics were applied as statistical tools for analysis and interpretation. Respondents' profile generally comprised female, middle adults with a monthly income of more than 20,000 Pesos and lived with two or more people. Less than half of the respondents' population (32.5% in total) were experiencing polypharmacy. They were highly adherent to their medications and had a moderate perspective on their medication regimen. Only polypharmacy showed a significant relationship with medication non-adherence, unlike age, gender, monthly income, and living status.

Keywords: polypharmacy, medicines, intentional non-adherence, unintentional non-adherence, biological parents, pharmacy students

INTRODUCTION

In health, drug use is one of the essential factors contributing to this line's ever-growing concern. The World Health Organization describes a drug as any substance listed on the pharmacopeia or any substance used for diagnosing, mitigating, preventing treatment, and cure diseases in both man and animal (2003).

As people age, so does their body. Our body inevitably grows weaker as we age. Bone shrinks, the heart becomes stiffer, kidneys get smaller, and many more occurrences can lead to health deficits. The older we become, the more diseases we acquire, and the more complications are bound to occur. Multimorbidity is likely to happen wherein two or more health conditions exist at the same time. Due to such, complexity for the management of the disease is increased. Therefore, there is a need to intake one or more drugs to maintain the body's homeostasis and address the problem they encounter.

Polypharmacy is an essential thing to be considered as we age. Our body

becomes more sensitive and frailer; there are increased health concerns, and the ability to process the medication will significantly decrease. Polypharmacy is beneficial, particularly to those people who have chronic and acute diseases. Still, it is to be expected that as the number of the drug increases, so do the side effects, adverse drug reactions, and complications.

Participants of the World Health Organization Adherence meeting in June 2001 defined adherence as the extent to which the patient follows medical instructions (Jimmy & Jose, 2011). Yet, there are no firm factors that can genuinely predict adherence (World Health Organization, 2003). Medication adherence may depend on prospective memory, responsible for recalling to take the medication, and retrospective memory, responsible for identifying whether the drug has been accepted or not (Murray & Kroenke, 2001).

Moreover, nonadherence to essential medications presents a critical problem for public health (Fischer, Stedman, Lii, Vogeli, Shrak, Brookhard, & Weissman, 2010). A study has determined the extensiveness of Polypharmacy among its 226 hospitalized patients was 74% in addition to the 65% prevalence of index of cumulative morbidity (Trumic, Pranjic, Begic & Bečić, 2012). Indeed, Polypharmacy may establish higher risks as it may result in ineffective control of disease and contribute to numerous morbidity and Polypharmacy since patients tend to consciously choose to disregard their medications to avoid its unwanted side and adverse effects (Hughes, 2004).

This study aimed to determine how polypharmacy contribute to medication non-adherence among adults to show its usual occurrences that result in the growing threat it imposes on public health and the medical industry.

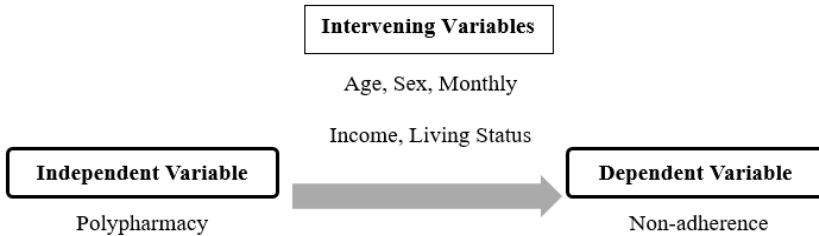
FRAMEWORK

In gaining sufficient learning and insights to support this study, the researchers anchored it on the following two theories, namely, the Theory of Planned Behaviour (TPB) developed by Icek Ajzen which started as the Theory of Reasoned Action in 1980, and Health Belief model (HBM) developed in the 1950's by social psychologists Rosenstock and others. Such theories have a bearing on the present study that focuses on the concept of polypharmacy and medication non adherence among adults (Deborah, 2017).

Using the theory of planned behavior, a psychological theory that links beliefs to behavior, the researchers predicted how the three core components, namely, attitude, subjective norms, and perceived behavioral control towards polypharmacy can altogether, shape an individual's motivation to adhere to their medication.

In addition, the health belief model was used to predict how internal or external

cues to action as well as the adult's self-efficacy – such as their ability to carry out the action – can influence their medication adherence. Such theories were bound to explain how an adult's age, gender, living status, monthly income as well as attitude and behavior towards polypharmacy could result to medication nonadherence.



OBJECTIVES OF THE STUDY

The study aimed to determine the relationship between polypharmacy and medication non-adherence among the biological parents of third-year pharmacy students from Liceo de Cagayan University.

METHODS

The data were gathered from a target population, namely Liceo de Cagayan University's third-year pharmacy students' biological parents. The response of all target populations assuming it will be qualified and accepted in this study employing stratified random sampling. The researchers employed a non-experimental, descriptive, correlation design to collect and analyze data. In conducting the study, the researchers aimed to describe the linkage connecting each variable as per Sousa, Driessnack, & Mendes, who has represented the descriptive correlational design as a study that describes the variables as its association or relationships that usually occurs naturally (2007). Findings of the quantitative (numerical and ordinal) data were equivalent to the conclusions obtained from Liceo de Cagayan University's third-year pharmacy students' biological parents. Such data obtained were analyzed using descriptive and inferential statistics. The researchers identified the respondents according to their demographic characteristics (i.e., Sex, Age, Living Status) and work-related variables (i.e., monthly income). Both inferential and descriptive statistics were utilized to analyze the data obtained from the questionnaire. These statistics were the Mean, Standard Deviation, Frequency, Percentage, and Pearson Correlation, which supported the quantitative data gathered.

For the reason of the health crisis brought upon the Covid-19 pandemic, the

researchers utilized a Google Form composed of four (4) sections – the first one was used as the certification of informed consent. As for the instruments, the following three (3) sections served as the survey questionnaire, containing eighteen (28) questions which were used in the study to collect data. Descriptive statistics were used to interpret all the data from the other parts of the questionnaire. Percentage and frequency count were utilized to determine the respondents’ descriptive profile in terms of age, sex, monthly income, and living status and to determining the polypharmacy prevalence. Five-point Likert Scale for the interpretation of the questionnaire’s section III. Mean and Standard Deviation was used to know the extent of medication non-adherence. Pearson Correlation Coefficient to determine the significant relationship between the two variables, polypharmacy and medication non-adherence.

RESULTS AND DISCUSSION

Table 1

Frequency and Percentage Distribution of the Participants Age |(N=77)

Age	<i>f</i>	%
Young Adult (18-29 years old)	0	0
Middle Adult (30-60 Years old)	68	88.3
Old Adult (61 years old and above)	9	11.7
Total	77	100

N= Total population. *f*= frequency. %= percentage.

The data above shows the frequency and percentage distribution of the participants’ age. Among the 77 respondents, 68 (88%) were middle adults, while the remaining 9 (12%) were old adults because the respondents were biological parents of already third-year college students. In a similar study on polypharmacy, particularly on the prevalence and determinants of polypharmacy in cardiovascular patients attending an outpatient clinic in Ethiopia University Hospital, 64% of the study’s respondents were adults 18-65 years old. Majority of the study participants on the nonadherence and factors affecting adherence of diabetic patients to anti-diabetic medication in Assela General Hospital, Oromia Region, Ethiopia, 189 (66%) were within 30-60 years, age group.

Table 2

Frequency and Percentage Distribution of the Participants Sex | (N=77)

Gender	<i>f</i>	%
Male	32	41.6
Female	45	58.4
Total	77	100

N= Total population. *f*= frequency. %= percentage.

This table reveals the frequency and percentage distribution of the participants' sex, in which 45 (58%) were female and 32 (42%) were males. The data conveyed that most of the respondents were biological mothers considering that there is a more significant population of mothers among Liceo de Cagayan University's third-year pharmacy students' list of parents. This can be associated with the Philippines National Demographic and Health Survey statement that 21% of households are headed by women.

Table 3

Frequency and Percentage Distribution of the Participants Monthly Income | (N=77)

Year Level	<i>f</i>	%
0 – 5,000 Php	11	14.3
5,001 – 10,000 Php	7	9.1
10,001 – 15,000 Php	16	20.8
15,001 – 20,000 Php	10	13.0
Above 20,000 Php	33	42.9
Total	77	100

N= Total population. *f*= frequency. %= percentage.

Table 3 displays that 33 (43%) of the parent participants have a monthly income of above 20,000 Php. More than half the following 16 (21%) parents have a range of 10,001 – 15,000 Php monthly income. Subsequently, 11 (14%) of the respondents earn 5,000 Php and less every month while 10 (13%) parents earn 15,001 – 20,000 Php monthly. Lastly, 7 (9%) parents of the third-year pharmacy students have a monthly income of 5,001 – 10,000 Php. Based on the data gathered, most parents belong to the low-income but not poor (P10,957- P21,914 monthly income),

middle and rich class (respectively having P21,914- P219,140 and P219,140 above monthly income) as per social class identification of the Philippine Institute for Development Studies (2018). The result is congruent to the PIDS statement that 40% of the Philippines’ population, which is 4 out of every 10 Filipinos, belongs to the middle-income class.

Table 4

Frequency and Percentage Distribution of the Participants Living Status | (N=77)

Living status	<i>f</i>	%
Living Alone	3	3.9
Living with one Person	1	1.3
Living with two or more People	73	94.8
Total	77	100

N= Total population. *f*= frequency. %= percentage.

The table above provides the frequency and percentage distribution of the participants’ living status. It was found that 73 (95%) of the biological parents of the third-year pharmacy students are living with two or more people. There were 3 (4%) parents who live alone while the remaining 1 (1%) parent lives with only one person. Based on the Philippines National Demographic and Health Survey, Filipino households consist of an average of 4.2 (=4) people, matching the results of this study (2017).

Table 5

Frequency and Percentage Distribution of the Participants Polypharmacy

Classification	<i>f</i>	%
0 or None	33	42.9
1 Only	19	24.7
2 or 4	21	27.3
5 or More	4	5.2
Total	77	100

f= frequency. %= percentage.

Table 5 shows the level of polypharmacy prevalence among the biological parents of Liceo de Cagayan University's third-year pharmacy students. Among the 77 participants, 43% was not taking any medication, 25% was taking one medication, 27% was taking two or four medication, and 5% was taking five or more medication. Polypharmacy defined as the use of many or more than one drug (Colley & Lucas, 1993), such that as shown in table 2, 27% and 5% were considered polypharmacy. The level of polypharmacy prevalence has increased gradually and become a global health problem (Zhang, Sundquist, Sundquist, & Ji, 2020). Prevalence of polypharmacy can associate with significant consequences such as the potential risk for adverse drug reactions may occur, possible drug-drug interaction, and can lead to medication nonadherence, poor quality of life, and unessential drug (Abdulraheem, 2013).

Table 6

Descriptive statistics of participant's level of medication non-adherence on Unintentional non-adherence: Forgetfulness | (N=140)

Indicators	Mean	SD	Interpretation
1. How often do you attend to scheduled medical appointments, such as check-ups and laboratory tests?	2.91	1.279	Moderately Adherent
2. How often do you take your medicine as instructed?	3.87	1.301	Highly Adherent
3. How often do you get your prescriptions filled?	3.52	1.392	Highly Adherent
4. How often do you make sure not to run out of medicine?	3.75	1.237	Highly Adherent
5. How often do you not skip a dose of your medicine before you go to the doctor?	3.51	1.411	Highly Adherent
6. How often do you keep on taking your medicine as prescribed, even if you feel better?	3.65	1.316	Highly Adherent
7. How often do you take your medicine as prescribed when you feel sick?	3.96	1.117	Highly Adherent
8. How often do you not take someone else's medicine?	3.18	1.652	Moderately Adherent
9. How often do you make sure not to miss taking your medicine due to carelessness?	3.61	1.216	Highly Adherent
10. How often do you stick to the prescribed dose of your medicines even if you feel better or worse?	3.68	1.240	Highly Adherent

Table 6 Continued

Indicators	Mean	SD	Interpretation
11. How often do you remember to take all your medicines when you are supposed to take it more than once a day?	3.48	1.165	Moderately Adherent
12. How often do you refill your medicines, even if you find it expensive?	3.76	1.210	Highly Adherent
13. How often do you plan ahead and refill your medicines before they run out?	3.69	1.103	Highly Adherent
Average Mean	3.58	1.031	Highly Adherent

N= Total population. SD= standard deviation.

In the table 6 shows that, it was observed that the biological parents of the third-year pharmacy students of Liceo de Cagayan University are highly adherent in taking their prescribed medications whenever they feel sick (Q7 Mean 3.96—Highest indicator), and are only moderately adherent in attending to their scheduled medical check-ups (Q1 Mean 2.91—Lowest indicator). Overall, the parents showed to adhere and not forget their medications, thus being classified as highly adherent (Average Mean 3.58).

Table 7

Descriptive statistics of participant's level of medication non-adherence on Intentional non-adherence: Attitude and Behavior| (N=77)

Indicators	Mean	SD	Interpretation
1. How often do you feel that you are taking a large number of medications?	2.82	1.439	Moderate Perspective
2. How often do you feel comfortable with the number of medications you are taking?	3.47	1.199	Moderate Perspective
3. How often do you believe that all your medications are necessary?	4.04	1.175	Strong Perspective
4. How often would you be willing to stop one or more of your regular medications if your doctor said it was possible?	3.71	1.266	Strong Perspective
5. How often would you like to reduce the number of medicines you are taking, if possible?	3.27	1.334	Moderate Perspective
6. How often do you feel that you may be taking one or more medications that you no longer need?	2.78	1.253	Moderate Perspective

Table 7 Continued

Indicators	Mean	SD	Interpretation
7. How often would you accept taking more medications when prescribed for your health conditions?	3.57	1.129	Strong Perspective
8. How often do you understand enough why you are prescribed with each of your medications?	4.01	1.094	Strong Perspective
9. How often does the cost of medications impact your willingness to take one or more of them?	3.45	1.241	Moderate Perspective
10. How often do you believe one or more of your medications is causing side effects?	3.49	1.273	Moderate Perspective
Average Mean	3.46	.831	Moderate Perspective

N= Total population. SD= standard deviation.

It was observed that the biological parents of the third-year pharmacy students of Liceo de Cagayan University have a strong perspective in the belief that all medicines prescribed to them are needed and essential (Q3 Mean 4.04—Highest indicator), and have a moderate perspective in thinking that they the medications that they were taking were no longer needed (Q6 Mean 2.78--Lowest indicator). All in all, the parents’ attitude and behavior regarding intentional medication non-adherence are moderate in perspective (Average Mean 3.46).

Table 8

Relationship Between medication non-adherence and the demographic profile of the participants

Variable	Correlation Coefficient	P-value	Interpretation
Age	.105	.365	Not Significant
Gender	.065	.576	Not Significant
Monthly Income	.163	.157	Not Significant
Living Status	-.080	.487	Not Significant
PolyPharmacy	.410**	.000	Significant

Note. **Correlation is significant at the 0.05 level (2-tailed).

The table shown above shows no significant relationship between the medication non-adherence and the demographic profile of the participants. It was observed that the correlation between the variables in comparing the p-value at

a significant level of 0.05, the participant's age p-value is .365, gender p-value is .576, monthly income is .157, living status is .487, and lastly, only polypharmacy p-value 0.000 gives significant relation to medication non-adherence. Moreover, a study conducted by Tan, Suppiah, Bautista, & Malhotra about polypharmacy was significantly correlated with medication non-adherence (2019). Impact on medication adherence is one of the probable consequences of polypharmacy (Marcum & Gellad, 2013).

CONCLUSIONS

Based on the data collected, results and interpretations, the researchers were able to come up with the following conclusions:

First, the profile of the respondents generally comprises female, middle adults with a monthly income of above 20,000 Php and are living with two or more people. It has also been recorded that less than half of the respondents' population are experiencing polypharmacy.

In terms of unintentional medication non-adherence, the parents of Liceo de Cagayan University's third-year pharmacy students do not forget to take their respective medicines. Thus, they are highly adherent to their medications. Concerning intentional medication non-adherence, the parents' attitude and behavior show a moderate perspective to their medication regimen.

There is no significant relationship between the demographic profile (i.e., age, gender, monthly income, and living status) of the parents of Liceo de Cagayan University's third-year pharmacy students and medication non-adherence. Lastly, there is a significant relationship between polypharmacy and medication non-adherence. Thus, the researchers reject the null hypothesis of this study and accept the alternative hypothesis.

RECOMMENDATIONS

Deriving from the results and conclusions attained, the researchers were able to formulate the following recommendations:

1. Other demographic information can be determined, which may significantly affect medication non-adherence such as educational attainment, healthcare accessibility, culture, etc. Future studies can focus on adults with predetermined comorbidities to ensure a level of polypharmacy is present. Another set of categories (such as primary and secondary non-adherence) of medication non-adherence can be identified. Several determinants of medication non-adherence can be examined by future researchers rather than polypharmacy and demographic profile alone.

2. This study can be a good basis for future studies on polypharmacy and non-adherence since it showed different results from the majority of the studies with the same variables.

3. This study can be grounds in creating health care intervention programs for improving medication practices in the country or internationally by providing awareness to physicians in the local context about the effects of polypharmacy to medication adherence of their patients and on the other hand, patients can be guided by this study to make therapeutic plans or schedule of their prescribed medicines to ensure compliance.

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