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Impact of a short training program on the knowledge and attitude of postgraduate health science students regarding research integrity.

THESIS

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BY

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FOR THE AWARD OF THE DEGREE OF DOCTOR OF MEDICINE

KEYWORDS:

RESEARCH INTEGRITY-TRAINING PROGRAM-POSTGRADUATE STUDENTS

JURY

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Professor of public health and community medicine

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Professor of public health and community medicine

Mrs. S.AIT BATAHAR

Professor of pneumology

Mr. N.RADA

Professor of Pediatrics

Mrs. A.SBAI

Professor of computer science

JUGES

Hippocratic Oath

*AT THE TIME OF BEING ADMITTED AS A MEMBER OF THE MEDICAL
PROFESSION:*

I solemnly pledge myself to consecrate my life to the service of humanity.

I will give to my teachers the respect and gratitude which is their due;

I will practice my profession with conscience and dignity;

The health of my patient will be my first consideration;

I will respect the secrets which are confided in me;

*I will maintain by all means in my power, the honor and the noble
traditions of the medical profession;*

My colleagues will be my brothers and sisters

*I will not permit considerations of religion, nationality, race, party
politics or social standing to intervene between my duty and my
patient;*

*I will maintain the utmost respect for human life from the time of
conception; even under threat, I will not use my medical knowledge
contrary to the laws of humanity.*

I make these promises solemnly, freely and upon my honor.

Declaration of Geneva, 1948

LIST OF PROFESSORS

UNIVERSITE CADI AYYAD
FACULTE DE MEDECINE ET DE PHARMACIE
MARRAKECH

Doyens Honoraires

: Pr. Badie Azzaman MEHADJI
: Pr. Abdelhaq ALAOUI YAZIDI
: Pr. Mohammed BOUSKRAOUI

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Doyen

: Pr. Said ZOUHAIR

Vice doyen de la Recherche et la Coopération

: Pr. Mohamed AMINE

Vice doyen des Affaires Pédagogiques

: Pr. Redouane EL FEZZAZI

Vice doyen Chargé de la Pharmacie

: Pr. Oualid ZIRAOUI

Secrétaire Générale

: Mr. Azzeddine EL HOUDAIGUI

Liste nominative du personnel enseignants chercheurs
permanant

N°	Nom et Prénom	Cadre	Spécialités
01	ZOUHAIR Said (Doyen)	P.E.S	Microbiologie
02	CHOULLI Mohamed Khaled	P.E.S	Neuro pharmacologie
03	BOUSKRAOUI Mohammed	P.E.S	Pédiatrie
04	KHATOURI Ali	P.E.S	Cardiologie
05	NIAMANE Radouane	P.E.S	Rhumatologie
06	AIT BENALI Said	P.E.S	Neurochirurgie
07	KRATI Khadija	P.E.S	Gastro-entérologie
08	SOUMMANI Abderraouf	P.E.S	Gynécologie-obstétrique
09	RAJI Abdelaziz	P.E.S	Oto-rhino-laryngologie
10	SARF Ismail	P.E.S	Urologie
11	MOUTAOUAKIL Abdeljalil	P.E.S	Ophtalmologie
12	AMAL Said	P.E.S	Dermatologie
13	ESSAADOUNI Lamiaa	P.E.S	Médecine interne
14	MANSOURI Nadia	P.E.S	Stomatologie et chirurgie maxillo faciale
15	MOUTAJ Redouane	P.E.S	Parasitologie
16	AMMAR Haddou	P.E.S	Oto-rhino-laryngologie
17	CHAKOUR Mohammed	P.E.S	Hématologie biologique
18	EL FEZZAZI Redouane	P.E.S	Chirurgie pédiatrique
19	YOUNOUS Said	P.E.S	Anesthésie-réanimation

20	BENELKHAIAT BENOMAR Ridouan	P.E.S	Chirurgie générale
21	ASMOUKI Hamid	P.E.S	Gynécologie-obstétrique
22	BOUMZEBRA Drissi	P.E.S	Chirurgie Cardio-vasculaire
23	CHELLAK Saliha	P.E.S	Biochimie-chimie
24	LOUZI Abdelouahed	P.E.S	Chirurgie-générale
25	AIT-SAB Imane	P.E.S	Pédiatrie
26	GHANNANE Houssine	P.E.S	Neurochirurgie
27	OULAD SAIAD Mohamed	P.E.S	Chirurgie pédiatrique
28	DAHAMI Zakaria	P.E.S	Urologie
29	EL HATTAOUI Mustapha	P.E.S	Cardiologie
30	AMINE Mohamed	P.E.S	Epidémiologie clinique
31	EL ADIB Ahmed Rhassane	P.E.S	Anesthésie-réanimation
32	ELFIKRI Abdelghani	P.E.S	Radiologie
33	ARSALANE Lamiae	P.E.S	Microbiologie-virologie
34	KAMILI El Ouafi El Aouni	P.E.S	Chirurgie pédiatrique
35	MAOULAININE Fadl mrabih rabou	P.E.S	Pédiatrie (Néonatalogie)
36	MATRANE Aboubakr	P.E.S	Médecine nucléaire
37	ADMOU Brahim	P.E.S	Immunologie
38	CHERIF IDRISSE EL GANOUNI Najat	P.E.S	Radiologie
39	MANOUDI Fatiha	P.E.S	Psychiatrie
40	BOURROUS Monir	P.E.S	Pédiatrie
41	TASSI Noura	P.E.S	Maladies infectieuses
42	NEJMI Hicham	P.E.S	Anesthésie-réanimation
43	LAOUAD Inass	P.E.S	Néphrologie
44	FOURAIJI Karima	P.E.S	Chirurgie
45	BOUKHIRA Abderrahman	P.E.S	Biochimie-chimie
46	KHALLOUKI Mohammed	P.E.S	Anesthésie-réanimation
47	BSISS Mohammed Aziz	P.E.S	Biophysique
48	EL OMRANI Abdelhamid	P.E.S	Radiothérapie
49	SORAA Nabila	P.E.S	Microbiologie-virologie

50	KHOUCHANI Mouna	P.E.S	Radiothérapie
51	JALAL Hicham	P.E.S	Radiologie
52	EL ANSARI Nawal	P.E.S	Endocrinologie et maladies métaboliques
53	AMRO Lamyae	P.E.S	Pneumo–phtisiologie
54	OUALI IDRISSE Mariem	P.E.S	Radiologie
55	ZAHLANE Mouna	P.E.S	Médecine interne
56	BENJILALI Laila	P.E.S	Médecine interne
57	NARJIS Youssef	P.E.S	Chirurgie générale
58	RABBANI Khalid	P.E.S	Chirurgie générale
59	SAMLANI Zouhour	P.E.S	Gastro–entérologie
60	LAGHMARI Mehdi	P.E.S	Neurochirurgie
61	ABOUSSAIR Nisrine	P.E.S	Génétique
62	BENCHAMKHA Yassine	P.E.S	Chirurgie réparatrice et plastique
63	CHAFIK Rachid	P.E.S	Traumato–orthopédie
64	ABKARI Imad	P.E.S	Traumato–orthopédie
65	EL BOUIHI Mohamed	P.E.S	Stomatologie et chirurgie maxillo faciale
66	LAKMICHI Mohamed Amine	P.E.S	Urologie
67	AGHOUTANE El Mouhtadi	P.E.S	Chirurgie pédiatrique
68	HOCAR Ouafa	P.E.S	Dermatologie
69	EL KARIMI Saloua	P.E.S	Cardiologie
70	EL BOUCHTI Imane	P.E.S	Rhumatologie
71	QAMOUSS Youssef	P.E.S	Anésthésie réanimation
72	ZYANI Mohammad	P.E.S	Médecine interne
73	QACIF Hassan	P.E.S	Médecine interne
74	BEN DRISS Laila	P.E.S	Cardiologie
75	MOUFID Kamal	P.E.S	Urologie
76	EL BARNI Rachid	P.E.S	Chirurgie générale
77	KRIET Mohamed	P.E.S	Ophtalmologie
78	BOUCHENTOUF Rachid	P.E.S	Pneumo–phtisiologie
79	ABOUCHADI Abdeljalil	P.E.S	Stomatologie et chirurgie maxillo faciale
80	BASRAOUI Dounia	P.E.S	Radiologie
81	RAIS Hanane	P.E.S	Anatomie Pathologique
82	BELKHOUS Ahlam	P.E.S	Rhumatologie

83	ZAOUI Sanaa	P.E.S	Pharmacologie
84	MSOUGAR Yassine	P.E.S	Chirurgie thoracique
85	EL MGHARI TABIB Ghizlane	P.E.S	Endocrinologie et maladies métaboliques
86	DRAISS Ghizlane	P.E.S	Pédiatrie
87	EL IDRISSE SLITINE Nadia	P.E.S	Pédiatrie
88	RADA Noureddine	P.E.S	Pédiatrie
89	BOURRAHOUAT Aicha	P.E.S	Pédiatrie
90	MOUAFFAK Youssef	P.E.S	Anesthésie-réanimation
91	ZIADI Amra	P.E.S	Anesthésie-réanimation
92	ANIBA Khalid	P.E.S	Neurochirurgie
93	TAZI Mohamed Ilias	P.E.S	Hématologie clinique
94	ROCHDI Youssef	P.E.S	Oto-rhino-laryngologie
95	FADILI Wafaa	P.E.S	Néphrologie
96	ADALI Imane	P.E.S	Psychiatrie
97	ZAHLANE Kawtar	P.E.S	Microbiologie- virologie
98	LOUHAB Nisrine	P.E.S	Neurologie
99	HAROU Karam	P.E.S	Gynécologie-obstétrique
100	BOUKHANNI Lahcen	P.E.S	Gynécologie-obstétrique
101	FAKHIR Bouchra	P.E.S	Gynécologie-obstétrique
102	BENHIMA Mohamed Amine	P.E.S	Traumatologie-orthopédie
103	HACHIMI Abdelhamid	P.E.S	Réanimation médicale
104	EL KHAYARI Mina	P.E.S	Réanimation médicale
105	AISSAOUI Younes	P.E.S	Anesthésie-réanimation
106	BAIZRI Hicham	P.E.S	Endocrinologie et maladies métaboliques
107	ATMANE El Mehdi	P.E.S	Radiologie
108	EL AMRANI Moulay Driss	P.E.S	Anatomie
109	BELBARAKA Rhizlane	P.E.S	Oncologie médicale
110	ALJ Soumaya	P.E.S	Radiologie
111	OUBAHA Sofia	P.E.S	Physiologie
112	EL HAOUATI Rachid	P.E.S	Chirurgie Cardio-vasculaire
113	BENALI Abdeslam	P.E.S	Psychiatrie
114	MLIHA TOUATI Mohammed	P.E.S	Oto-rhino-laryngologie
115	MARGAD Omar	P.E.S	Traumatologie-orthopédie

116	KADDOURI Said	P.E.S	Médecine interne
117	ZEMRAOUI Nadir	P.E.S	Néphrologie
118	EL KHADER Ahmed	P.E.S	Chirurgie générale
119	DAROUASSI Youssef	P.E.S	Oto-rhino-laryngologie
120	BENJELLOUN HARZIMI Amine	P.E.S	Pneumo-phtisiologie
121	FAKHRI Anass	P.E.S	Histologie-embyologie cytogénétique
122	SALAMA Tarik	P.E.S	Chirurgie pédiatrique
123	CHRAA Mohamed	P.E.S	Physiologie
124	ZARROUKI Youssef	P.E.S	Anesthésie-réanimation
125	AIT BATAHAR Salma	P.E.S	Pneumo-phtisiologie
126	ADARMOUCH Latifa	P.E.S	Médecine communautaire (médecine préventive, santé publique et hygiène)
127	BELBACHIR Anass	P.E.S	Anatomie pathologique
128	HAZMIRI Fatima Ezzahra	P.E.S	Histologie-embyologie cytogénétique
129	EL KAMOUNI Youssef	P.E.S	Microbiologie-virologie
130	EL MEZOUARI El Mostafa	P.E.S	Parasitologie mycologie
131	SERGHINI Issam	P.E.S	Anesthésie-réanimation
132	ABIR Badreddine	P.E.S	Stomatologie et chirurgie maxillo faciale
133	GHAZI Mirieme	P.E.S	Rhumatologie
134	ZIDANE Moulay Abdelfettah	P.E.S	Chirurgie thoracique
135	LAHKIM Mohammed	P.E.S	Chirurgie générale
136	MOUHSINE Abdelilah	P.E.S	Radiologie
137	TOURABI Khalid	P.E.S	Chirurgie réparatrice et plastique
138	ARABI Hafid	P.E.S	Médecine physique et réadaptation fonctionnelle
139	BELHADJ Ayoub	P.E.S	Anesthésie-réanimation
140	BOUZERDA Abdelmajid	P.E.S	Cardiologie
141	ABDELFETTAH Youness	P.E.S	Rééducation et réhabilitation fonctionnelle
142	REBAHI Houssam	P.E.S	Anesthésie-réanimation
143	BENNAOUI Fatiha	P.E.S	Pédiatrie
144	ZOUIZRA Zahira	P.E.S	Chirurgie Cardio-vasculaire

145	SEBBANI Majda	P.E.S	Médecine Communautaire (Médecine préventive, santé publique et hygiène)
146	FENANE Hicham	Pr Ag	Chirurgie thoracique
147	ABDOU Abdessamad	P.E.S	Chirurgie Cardio-vasculaire
148	HAMMOUNE Nabil	P.E.S	Radiologie
149	ESSADI Ismail	P.E.S	Oncologie médicale
150	ALJALIL Abdelfattah	P.E.S	Oto-rhino-laryngologie
151	LAFFINTI Mahmoud Amine	P.E.S	Psychiatrie
152	RHARRASSI Issam	P.E.S	Anatomie-pathologique
153	ASSERRAJI Mohammed	P.E.S	Néphrologie
154	JANAH Hicham	P.E.S	Pneumo-phthisiologie
155	NASSIM SABAH Taoufik	P.E.S	Chirurgie réparatrice et plastique
156	ELBAZ Meriem	P.E.S	Pédiatrie
157	SEDDIKI Rachid	P.E.S	Anesthésie-réanimation
158	BELGHMAIDI Sarah	Pr Ag	Ophtalmologie
159	GEBRATI Lhoucine	MC Hab	Chimie
160	FDIL Naima	MC Hab	Chimie de coordination bio-organique
161	LOQMAN Souad	MC Hab	Microbiologie et Toxicologie
162	BAALLAL Hassan	Pr Ag	Neurochirurgie
163	BELFQUIH Hatim	Pr Ag	Neurochirurgie
164	AKKA Rachid	Pr Ag	Gastro-entérologie
165	BABA Hicham	Pr Ag	Chirurgie générale
166	MAOUJOUD Omar	Pr Ag	Néphrologie
167	SIRBOU Rachid	Pr Ag	Médecine d'urgence et de catastrophe
168	DAMI Abdallah	Pr Ag	Médecine Légale
169	AZIZ Zakaria	Pr Ag	Stomatologie et chirurgie maxillo faciale
170	ELOUARDI Youssef	Pr Ag	Anesthésie-réanimation
171	LAHLIMI Fatima Ezzahra	Pr Ag	Hématologie clinique
172	NASSIH Houda	Pr Ag	Pédiatrie
173	LAHMINI Widad	Pr Ag	Pédiatrie
174	BENANTAR Lamia	Pr Ag	Neurochirurgie
175	EL FADLI Mohammed	Pr Ag	Oncologie médicale
176	AIT ERRAMI Adil	Pr Ag	Gastro-entérologie

177	CHETTATI Mariam	Pr Ag	Néphrologie
178	BOUTAKIOUTE Badr	Pr Ag	Radiologie
179	SAYAGH Sanae	Pr Ag	Hématologie
180	EL FAKIRI Karima	Pr Ag	Pédiatrie
181	EL FILALI Oualid	Pr Ag	Chirurgie Vasculaire périphérique
182	EL- AKHIRI Mohammed	Pr Ag	Oto-rhino-laryngologie
183	HAJJI Fouad	Pr Ag	Urologie
184	JALLAL Hamid	Pr Ag	Cardiologie
185	ZBITOU Mohamed Anas	Pr Ag	Cardiologie
186	RAISSI Abderrahim	Pr Ag	Hématologie clinique
187	EL HAKKOUNI Awatif	Pr Ag	Parasitologie mycologie
188	ACHKOUN Abdessalam	Pr Ag	Anatomie
189	DARFAOUI Mouna	Pr Ag	Radiothérapie
190	EL-QADIRY Rabiyy	Pr Ag	Pédiatrie
191	ELJAMILI Mohammed	Pr Ag	Cardiologie
192	HAMRI Asma	Pr Ag	Chirurgie Générale
193	ELATIQI Oumkeltoum	Pr Ag	Chirurgie réparatrice et plastique
194	BENZALIM Meriam	Pr Ag	Radiologie
195	ABOULMAKARIM Siham	Pr Ag	Biochimie
196	LAMRANI HANCHI Asmae	Pr Ag	Microbiologie-virologie
197	HAJHOUI Farouk	Pr Ag	Neurochirurgie
198	EL KHASSOUI Amine	Pr Ag	Chirurgie pédiatrique
199	CHAHBI Zakaria	Pr Ag	Maladies infectieuses
200	MEFTAH Azzelarab	Pr Ag	Endocrinologie et maladies métaboliques
201	BELLASRI Salah	Pr Ag	Radiologie
202	ATMANI Nouredine	Pr Ag	Chirurgie Cardio-vasculaire
203	AABBASSI Bouchra	Pr Ag	Pédopsychiatrie
204	DOUIREK Fouzia	Pr Ag	Anesthésie-réanimation
205	SAHRAOUI Houssam Eddine	Pr Ag	Anesthésie-réanimation
206	RHEZALI Manal	Pr Ag	Anesthésie-réanimation
207	ABALLA Najoua	Pr Ag	Chirurgie pédiatrique
208	MOUGUI Ahmed	Pr Ag	Rhumatologie
209	ZOUITA Btissam	Pr Ag	Radiologie

210	HAZIME Raja	Pr Ag	Immunologie
211	SALLAHI Hicham	Pr Ag	Traumatologie–orthopédie
212	BENCHAFAI Ilias	Pr Ag	Oto–rhino–laryngologie
213	EL JADI Hamza	Pr Ag	Endocrinologie et maladies métaboliques
214	AZAMI Mohamed Amine	Pr Ag	Anatomie pathologique
215	FASSI FIHRI Mohamed jawad	Pr Ag	Chirurgie générale
216	CHETOUI Abdelkhalek	Pr Ag	Cardiologie
217	ROUKHSI Redouane	Pr Ag	Radiologie
218	ARROB Adil	Pr Ag	Chirurgie réparatrice et plastique
219	MOULINE Souhail	Pr Ag	Microbiologie–virologie
220	AZIZI Mounia	Pr Ag	Néphrologie
221	BOUHAMIDI Ahmed	Pr Ag	Dermatologie
222	YANISSE Siham	Pr Ag	Pharmacie galénique
223	KHALLIKANE Said	Pr Ag	Anesthésie–réanimation
224	ZIRAOUI Oualid	Pr Ag	Chimie thérapeutique
225	IDALENE Malika	Pr Ag	Maladies infectieuses
226	LACHHAB Zineb	Pr Ag	Pharmacognosie
227	ABOUDOURIB Maryem	Pr Ag	Dermatologie
228	AHBALA Tariq	Pr Ag	Chirurgie générale
229	EL AOUAME Amal	Pr Ag	Orthodontie et orthopédie dento–faciale
230	WARDA Karima	MCHab	Microbiologie
231	SBAI Asma	MCHab	Informatique
232	ABISSY Meriem	MC	Microbiologie
233	SLIOUI Badr	MC	Radiologie
234	CHEGGOUR Mouna	MC	Biochimie
235	BELARBI Marouane	MC	Néphrologie
236	EL AMIRI My Ahmed	MC	Chimie de Coordination bio–organnique
237	LALAOUI Abdessamad	MC	Pédiatrie
238	ESSAFTI Meryem	MC	Anesthésie–réanimation
239	RACHIDI Hind	MC	Anatomie pathologique
240	FIKRI Oussama	MC	Pneumo–phtisiologie
241	EL HAMDAOUI Omar	MC	Toxicologie
242	EL HAJJAMI Ayoub	MC	Radiologie

243	BOUMEDIANE El Mehdi	MC	Traumato-orthopédie
244	RAFI Sana	MC	Endocrinologie et maladies métaboliques
245	JEBRANE Ilham	MC	Pharmacologie
246	LAKHDAR Youssef	MC	Oto-rhino-laryngologie
247	LGHABI Majida	MC	Médecine du Travail
248	AIT LHAJ El Houssaine	MC	Ophtalmologie
249	RAMRAOUI Mohammed-Es-said	MC	Chirurgie générale
250	EL MOUHAFID Faisal	MC	Chirurgie générale
251	AHMANNNA Hussein-choukri	MC	Radiologie
252	AIT M'BAREK Yassine	MC	Neurochirurgie
253	ELMASRIOUI Joumana	MC	Physiologie
254	FOURA Salma	MC	Chirurgie pédiatrique
255	LASRI Najat	MC	Hématologie clinique
256	BOUKTIB Youssef	MC	Radiologie
257	MOUROUTH Hanane	MC	Anesthésie-réanimation
258	BOUZID Fatima zahrae	MC	Génétique
259	MRHAR Soumia	MC	Pédiatrie
260	QUIDDI Wafa	MC	Hématologie
261	BEN HOUMICH Taoufik	MC	Microbiologie-virologie
262	FETOUI Imane	MC	Pédiatrie
263	FATH EL KHIR Yassine	MC	Traumato-orthopédie
264	NASSIRI Mohamed	MC	Traumato-orthopédie
265	AIT-DRISS Wiam	MC	Maladies infectieuses
266	AIT YAHYA Abdelkarim	MC	Cardiologie
267	DIANI Abdelwahed	MC	Radiologie
268	AIT BELAID Wafae	MC	Chirurgie générale
269	ZTATI Mohamed	MC	Cardiologie
270	HAMOUCHE Nabil	MC	Néphrologie
271	ELMARDOULI Mouhcine	MC	Chirurgie Cardio-vasculaire
272	BENNIS Lamiae	MC	Anesthésie-réanimation
273	BENDAOUUD Layla	MC	Dermatologie
274	HABBAB Adil	MC	Chirurgie générale
275	CHATAR Achraf	MC	Urologie

276	OUMGHAR Nezha	MC	Biophysique
277	HOUMAID Hanane	MC	Gynécologie-obstétrique
278	YOUSFI Jaouad	MC	Gériatrie
279	NACIR Oussama	MC	Gastro-entérologie
280	BABACHEIKH Safia	MC	Gynécologie-obstétrique
281	ABDOURAFIQ Hasna	MC	Anatomie
282	TAMOUR Hicham	MC	Anatomie
283	IRAQI HOUSSAINI Kawtar	MC	Gynécologie-obstétrique
284	EL FAHIRI Fatima Zahrae	MC	Psychiatrie
285	BOUKIND Samira	MC	Anatomie
286	LOUKHNATI Mehdi	MC	Hématologie clinique
287	ZAHROU Farid	MC	Neurochirurgie
288	MAAROUFI Fathillah Elkarim	MC	Chirurgie générale
289	EL MOUSSAOUI Soufiane	MC	Pédiatrie
290	BARKICHE Samir	MC	Radiothérapie
291	ABI EL AALA Khalid	MC	Pédiatrie
292	AFANI Leila	MC	Oncologie médicale
293	EL MOULOUA Ahmed	MC	Chirurgie pédiatrique
294	LAGRINE Mariam	MC	Pédiatrie
295	DAFIR Kenza	MC	Génétique
296	CHERKAOUI RHAZOUANI Oussama	MC	Neurologie
297	ABAINOU Lahoussaine	MC	Endocrinologie et maladies métaboliques
298	BENCHANNA Rachid	MC	Pneumo-phtisiologie
299	EL GUAZZAR Ahmed (Militaire)	MC	Chirurgie générale
300	OULGHOUL Omar	MC	Oto-rhino-laryngologie
301	AMOCH Abdelaziz	MC	Urologie
302	ZAHLAN Safaa	MC	Neurologie
303	EL MAHFOUDI Aziz	MC	Gynécologie-obstétrique
304	CHEHBOUNI Mohamed	MC	Oto-rhino-laryngologie
305	LAIRANI Fatima ezzahra	MC	Gastro-entérologie
306	SAADI Khadija	MC	Pédiatrie
307	TITOU Hicham	MC	Dermatologie
308	EL GHOUL Naoufal	MC	Traumato-orthopédie

309	BAHI Mohammed	MC	Anesthésie-réanimation
310	RAITEB Mohammed	MC	Maladies infectieuses
311	DREF Maria	MC	Anatomie pathologique
312	ENNACIRI Zainab	MC	Psychiatrie
313	BOUSSAIDANE Mohammed	MC	Traumato-orthopédie
314	JENDOUI Omar	MC	Urologie
315	MANSOURI Maria	MC	Génétique
316	ERRIFAIY Hayate	MC	Anesthésie-réanimation
317	BOUKOUB Naila	MC	Anesthésie-réanimation
318	OUACHAOU Jamal	MC	Anesthésie-réanimation
319	EL FARGANI Rania	MC	Maladies infectieuses
320	IJIM Mohamed	MC	Pneumo-phtisiologie
321	AKANOUR Adil	MC	Psychiatrie
322	ELHANAFI Fatima Ezzohra	MC	Pédiatrie
323	MERBOUH Manal	MC	Anesthésie-réanimation
324	BOUROUMANE Mohamed Rida	MC	Anatomie
325	IJDDA Sara	MC	Endocrinologie et maladies métaboliques
326	GHARBI Khalid	MC	Gastro-entérologie
327	ATBIB Yassine	MC	Pharmacie clinique
328	MOURAFIQ Omar	MC	Traumato-orthopédie
329	ZAIZI Abderrahim	MC	Traumato-orthopédie
330	HENDY Iliass	MC	Cardiologie
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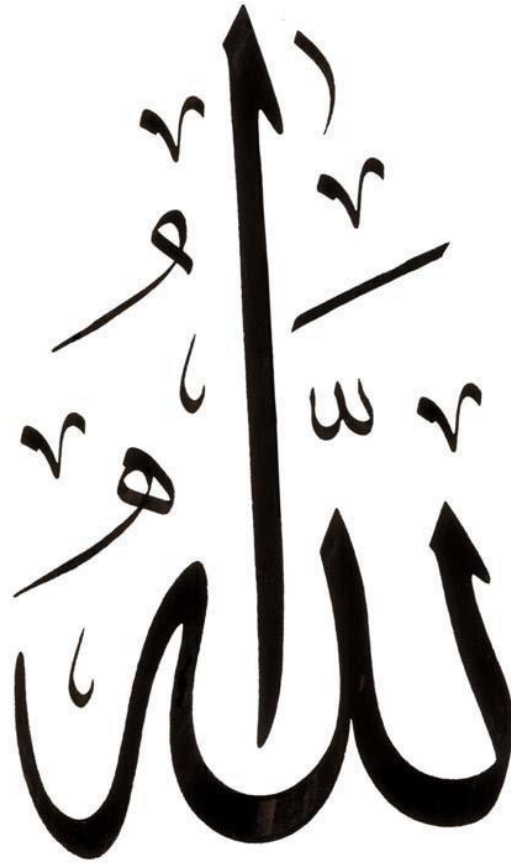
DEDICATIONS

I am truly grateful to the people who have supported and stood by me throughout this journey. Your guidance and constant encouragement have made this journey easier.

It is with love, respect and gratitude that



I dedicate this thesis to.....



To Allah, Al-Qahhār

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ABREVIATIONS

LISTE OF ABBREVIATIONS

ICJME	: international committee of medical journal.
KAP	: knowledge, attitude and practice.
RCR	: responsible conduct of research.
SPSS	: statistical package for the social science.
TPB	: theory of planned behaviours.
TR	A: theory of reasoned actions.
WHO	: world health organisation.

Attitudes toward the acceptability of RCR practices

SM	: scientific misconduct
RE	: research ethics
DFF	: data fabrication and falsification
PLAG	: plagiarism
COI	: conflict of interest

Item Code	Item (Original wording)
RE_1	Conducting research involving human subjects without prior approval from an REC
RE_2	Use of confidential information about research subjects without their authorization
RE_3	Not obtaining proper informed consent from participants
DFF_1	Making up research data
DFF_2	Changing research data without mentioning it
DFF_3	Dropping “outliers” without mentioning it
DFF_4	Selecting only those data that support your hypothesis
Plag_1	Publishing results that belong to someone else
Plag_2	Using someone else’s words or ideas without giving proper credit
Plag_3	Submitting a manuscript to a journal that you already published in another journal
Authorship_1	Giving authorship credit to someone who has not contributed substantively to a manuscript
Authorship_2	Denying authorship credit to someone who has contributed substantively to a manuscript
Authorship_3	Allowing your name to be put on papers to which you have made no reasonable contribution
COI_1	Awareness of a conflict of interest and did not disclose it to either the ethics committee or a journal
COI_2	Compromising the rigor of a study’s design or methodology in response to pressure from a commercial or not-for-profit funding source
COI_3	Inappropriately altering or suppressing research results in response to pressure from a commercial or not-for-profit funding source
SM_1	I’m concerned about the amount of misconduct that occurs
SM_2	The responsibility for misconduct lies with the principal investigator only
SM_3	Investigators should report instances of research misconduct
SM_4	Investigators should declare conflicts of interest to the appropriate officials
SM_5	I should monitor my trainees’ work to ensure that they are developing into responsible researchers

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INTRODUCTION

In a time of easy accessibility to artificial intelligence, digital tools and software, human integrity especially among researchers is tested more than ever. Integrity is what makes us responsible humans; it is the quality that makes individuals reliable in their actions, consistent in their values, accountable for their actions, and worthy of trust and respect. While personal integrity is important in everyday life, it becomes even more critical in research, where research integrity ensures transparency, honest, rigour, accountability and with genuine respect for truth.

This distinction leads directly to the broader discussion of the global importance of research integrity, a concern that has gained significant attention across international scientific and academic communities. The importance of research integrity is not limited by social, political or cultural background, which is why international efforts have been made to strengthen responsible research conduct which led to the development of the Singapore statement of research integrity(1), which outlines the core principles of research, which is recognized as the foundation of ethical research worldwide.

It is in no doubt that public trust in scientific research depends on ethical principles, which embodies research integrity as a whole. A study from the international journal of public opinion research(2), Oxford Academy showed that ethical misconducts significantly reduces trust in scientific research regardless of individuals level of science literacy, and without public trust, the scientific world is doomed as willingness of scientist to participate in research will be significantly affected, so will financing, credibility and acceptability of scientific research.

Research integrity is vital for health sciences, yet misconduct remains worryingly prevalent among students in this field. A study by Khadem-Rezaiyan et al. conducted at an Iranian university(3), involving General Practitioners (31%), residents (44%), master's students (21%), and PhD students (4%), revealed that over 60% of participants reported research misconduct, with plagiarism present in 57.5%, data fabrication or falsification in 12.4%, and

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authorship misconduct in 4.6%, highlighting the prevalence of research misconduct in the health science field.

In another study by Hofmann et al. (2020) Titled “Research Integrity Among PhD Students at the Faculty of Medicine: A Comparison of Three Scandinavian Universities”(4) in Denmark, Sweden and Norway. Out of the 285 respondents, 1% admitted to severe plagiarism, about 10 to 20% had altered data in some questionable way and 30% had collected more data to get a statistically significant result. These findings reiterate the prevalence of research misconduct in the medical field.

In another study by Bain *et al.* titled “Fostering research integrity in sub-Saharan Africa: challenges, opportunities, and recommendations”(5), it was reported in a study in Nigeria that over 68% of researchers admitted to having committed at least one form of scientific misconduct, including authorship conflict (36.4%), plagiarism (9.4%) and data falsification (42%), intentional violation of participant recruitment procedures and pressure from sponsors (19.4%) which clearly results in conflicts of interests.

These data illustrates the prevalence of research misconduct among health science students and that it is not only limited to developing countries but extended to well establish universities in developed countries, which calls for the urgent need for research integrity training and other solutions worldwide especially for health science students. Based on this evidence it is important to study how research integrity is perceived and addressed internationally, especially in Morocco and Africa at large.

Recent evidence from Morocco indicates that research misconduct is a significant concern among medical students and professionals. Touissi et al.(6) found widespread plagiarism in medical theses across four universities, largely attributed to insufficient training on research integrity and academic pressure. Similarly, Moujtahid et al.(7) reported that among residents and undergraduates, 63% engaged in some form of research misconduct over the past year, including unethical authorship practices, while prior training in research integrity was associated with lower odds of misconduct.

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An exploratory study by El Bairi et al.(8)reported a significant level of misconduct among students and professors, which was mainly attributed to lack of knowledge on research integrity. The majority of respondents who claimed to have knowledge on plagiarism were unable to correctly identify the definition of plagiarism and almost half of them claimed to have engaged in plagiarism after being provided with the correct definition. These studies demonstrate a clear lack of training on research integrity which is why the prevalence of research misconduct is on the rise and needs urgent solutions.

Beyond the Moroccan context, continental studies reveal that plagiarism and other forms of scientific misconduct are equally prevalent across other African countries, a study in East Africa, Ethiopia by Belay Hailu et al.(9) where 37.7% of the 244 researchers admitted to engaging in at least one form of research misconduct, in which 47% were reported to have been authorship misconduct. Pressure to publish and lack of training programs were also evoked to be the main causes of research misconduct.

A “university world news” publication search of the “Retraction watch”(10) database revealed a total of 52 articles were retracted from North African countries from 2020 to 2022, predominantly from Egypt (39) and the main cause of retraction was research misconducts such as plagiarism, fabrication and falsification of data. These findings demonstrate the prevalence of misconduct in North Africa, but other studies highlight that misconduct spreads beyond this region.

Beyond North Africa, a study in West Africa by Okonta et al.(11) reported that 69% of participants admitted to have been involved in at least one form of research misconduct, predominantly plagiarism. The main causes of these misconducts were as a result of lack of training and weak institutional measures. In total, these evidences highlight the situation in Africa and the lack of proper training. The next step is not just identifying the problems but also identifying solutions, especially asking how training programs can change and enhance research integrity.

Impact of a short training program on the knowledge and attitude of postgraduate health science students regarding research integrity.

In reference to multiple studies on the impact of training programs, A recent study by Greco et al. (2024)(12) reported that the understanding of rules and procedures related to research misconduct significantly increased from 38.5% (pre training) to 61.5% (post training), Concern about misconduct prevalence also nearly doubled from 30.8% (pre training) to 61.5%(post training) and agreement that all research personnel require research training reached over 90% post training, which shows the impact a training program can have on research integrity.

In another study by Cenci et al. (2025) “Fostering open science and responsible research practices: A pre-post study”(13), also noted a significant improvement in open science and responsible research conduct following the educational program, participants also reported greater adherence to research integrity after the program, which implies that a training program can shift the attitude and perception of health science students to adhere more to responsible research practices.

Research integrity is the basis and backbone of credible science, but the evidence we have reviewed shows the prevalence of research misconduct widespread in both developing and developed countries. Studies from Morocco, Ethiopia and Nigeria paints a greater picture of the situation in Africa with rampant and high levels of research misconduct and the main causes were mainly lack of knowledge and well structured training.

Based on the evidence reviewed, it was reported that training programs have a significant effect of improving the knowledge, attitude and practices of research integrity especially for health science students.

OBJECTIVES:

- Primary: to evaluate the impact of a short training program on the knowledge and attitude of post graduate health science students.

Secondary: To achieve a high level of participant satisfaction regarding the training program objectives, content, and methods

CONCEPTUAL FRAMEWORK

Impact of a short training program on the knowledge and attitude of postgraduate health science students regarding research integrity.

To understand the impact of a short training program on health students' knowledge and attitudes regarding research integrity we pointed out four conceptual frameworks to help us better understand the subject. To have a better understanding of the core values of research integrity, we will use the “The UK Research Integrity Office”(14) framework. To evaluate knowledge, attitudes and practices, we will use the Knowledge, Attitude and Practice conceptual framework (WHO 1950-1960). To evaluate the impact of the intervention (training program) we will be using the Kirkpatrick’s Four-Level Model and finally we will use the Theory of Planned behaviours to better understand why people intend to perform certain behaviours and what influences those intentions.

The UK Research Integrity Office framework discusses research integrity based on honesty, accountability, respect, transparency and rigour. It highlights how research integrity involves all aspects of research from the design of the project to the dissemination of its results, and how environments and structures should safeguard integrity and good research practices rather than hinder it. It highlights the importance of sticking with these core values: honesty; especially in authorship, financial contributions and presentation of findings. Rigor; “when drawing interpretations and conclusions from research, including when communicating findings and the fact that the integrity of the research record should be protected through secure and rigorous approaches”. Transparency; open communication on methods and tools used during research, and also declaring conflict of interest. Respect; necessary for everyone in research, especially to protect the integrity of research records. Accountability, to all participants involved in research, and to hold individuals accountable for when practices are not up to par.

In total, this framework discusses the core values needed by all researchers for better research practices and research integrity at large.



Figure 1: The UK RESEARCH INTEGRITY OFFICE conceptual framework.

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The KAP model(15) conceptual framework was developed between 1950 and 1960 by the WHO. This model is universally recognized and has been applied in all areas of science, especially public health and family planning since the early 20th century. The model extensively assumes that the acquisition of knowledge influences one's attitudes, which in turn changes practices. The KAP model has been used effectively, especially in "pre-post" studies, which involve a training program as it evaluates the immediate changes in knowledge and attitudes and shows a clear pathway in which practices can change.

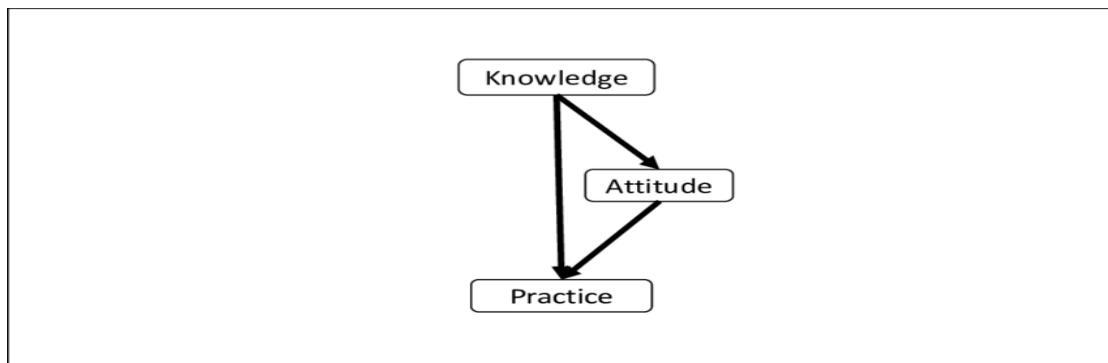


Figure 2: The KAP model.

The third conceptual framework is Kirkpatrick's Four Levels of Training Evaluation(16), developed in the 1950s, which provides a structured approach to evaluating the effectiveness of training results across four levels; reaction, learning, behaviour and results. Reaction evaluates the overall satisfaction of the training. Learning evaluates the knowledge, skills and attitudes gained from the training. Behaviour evaluates whether practices change after the training, and finally, results show if there is an overall improvement in the organization or society.

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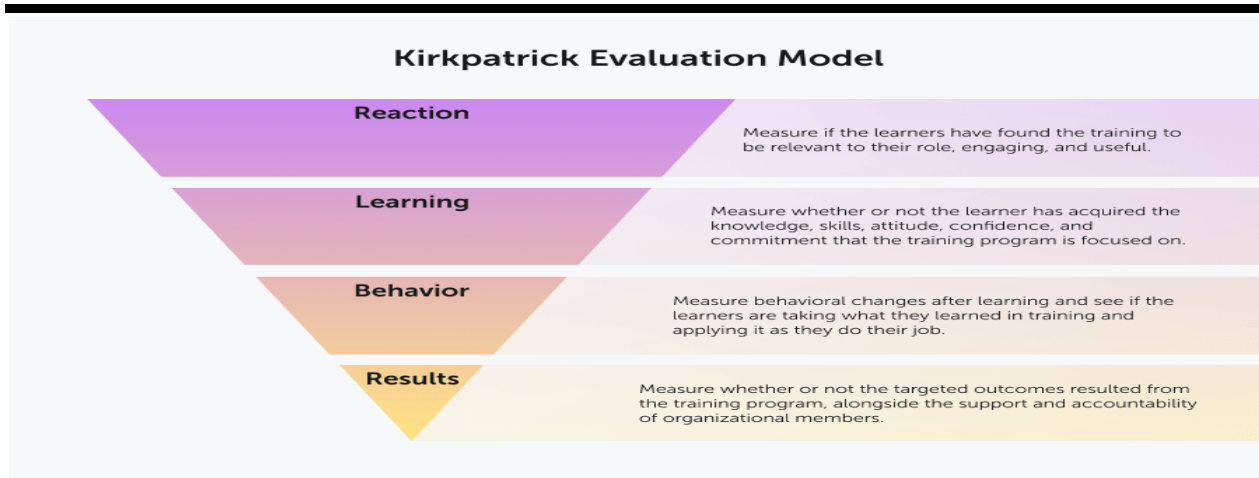


Figure 3: The Kirkpatrick's model

The final conceptual framework is The Theory of Planned Behaviour(17), developed by Icek Ajzen in 1985, the framework was initially co developed with Martin fishbein in the 1970s but it was initially called Theory of Reasoned Action (TRA). The TRA was later developed because of its limitation as it assumes that humans had complete control over their actions. The theory is based on behavioural beliefs, subjective norms or normative beliefs and control beliefs. The TRB states that behavioural belief produces favourable and unfavourable attitudes towards the behaviour, normative beliefs results in perceived social pressure and control beliefs leads to perceived behavioural control or self efficacy. In total the TPB suggests that attitude, subjective norms and perceived behavioural control shapes whether we intend to do things or not and that intention is the greatest predictor of behaviour.

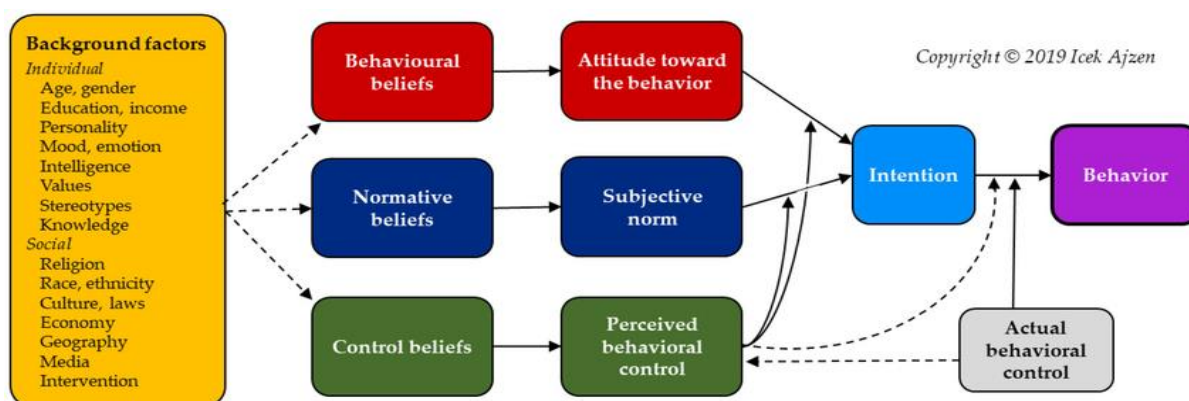


Figure 4: The Theory of planned behaviour model.

Impact of a short training program on the knowledge and attitude of postgraduate health science students regarding research integrity.

Our conceptual framework shows how age, study level, research experience and research integrity training play a role in prior knowledge, attitudes and practices which represents the Theory of Planned Behaviours. We then see the impact the training program can have in improving knowledge, having better attitude towards research and responsible research practices which follows the KAP conceptual framework. We then have the evaluation of satisfaction of the training program which follows the Kirkpatrick's four levels of training evaluation.

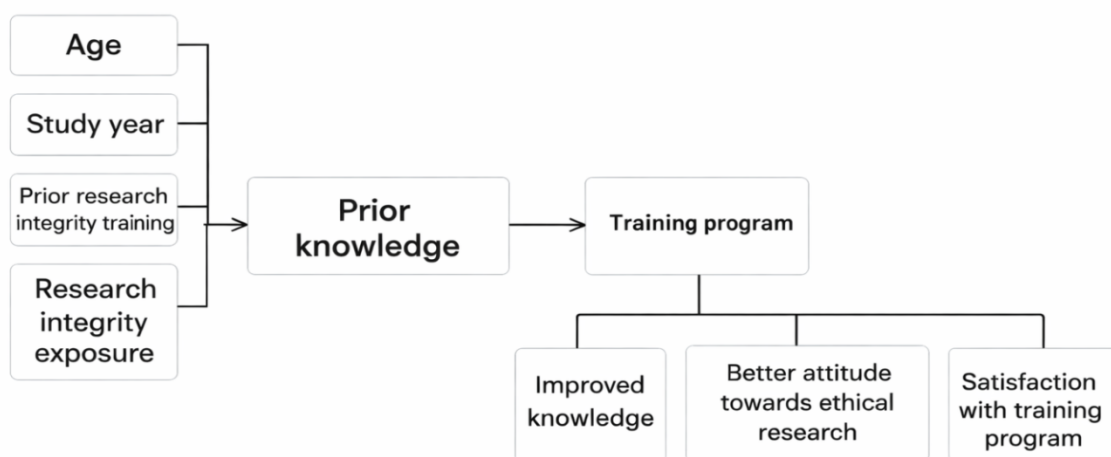


Figure 5: Impact of a short training program on the knowledge and attitude of postgraduate health science students regarding research integrity conceptual framework

KEY DEFINITIONS AND CONCEPTS:

- **RESEARCH INTEGRITY:** According to The Office of Research Integrity, “Research integrity may be defined as active adherence to the ethical principles and professional standards essential for the responsible practice of research”. These practices include: honesty, transparency, respect, accountability and rigour.
- **RESEARCH MISCONDUCT:** According to the Commission of Research Integrity, “Research misconduct is significant misbehaviour that improperly appropriates the intellectual property or contributions of others, that intentionally impedes the progress of research, or that risks corrupting the scientific record or compromising the integrity of scientific practices. These practices include plagiarism, fabrication of data. Falsification of data, authorship misconduct and conflict of interest to name a few.
- **PLAGIARISM:** The US Office of Research Integrity defines plagiarism as “both the theft or misappropriation of intellectual property and the substantial unattributed textual copying of another's work. It does not include authorship or credit disputes. The theft or misappropriation of intellectual property includes the unauthorized use of ideas or unique methods obtained by a privileged communication, such as a grant or manuscript review.” The Longman Contemporary English Advanced Learner’s Dictionary defines the act of plagiarism as “when someone uses another person’s words, ideas, or work and pretends they are their own’. The different types of plagiarism include: self plagiarism, verbatim, paraphrasing plagiarism and so on.
- **FABRICATION:** The Indian Journal of Public Health defines fabrication as the “invention of data or information. Fabricating data involves creating a new record of data or results. Most commonly fabricated documents are informed consent forms and patient diaries”.
- **FALSIFICATION:** A paper by Taylor and Francis group titled “Data Falsification and Question on Academic Integrity” states that According to 42 Code of Federal Regulations (CFR) Part 93, “Falsification means manipulating research materials, equipment, or processes,

or changing or omitting data or results such that the research is not accurately represented in the research record”.

- **AUTHORSHIP:** According to the international committee of medical journal editors (icmje), “Authorship means both accountability and independence. A submitted manuscript is the intellectual property of its authors, not the study sponsor. We will not review or publish articles based on studies that are conducted under conditions that allow the sponsor to have sole control of the data or to withhold publication. We encourage investigators to use the revised ICMJE requirements on publication ethics to guide the negotiation of research contracts. Those contracts should give the researchers a substantial say in trial design, access to the raw data, responsibility for data analysis and interpretation, and the right to publish--the hallmarks of scholarly independence and, ultimately, academic freedom. By enforcing adherence to these revised requirements, we can as editors assure our readers that the authors of an article have had a meaningful and truly independent role in the study that bears their names. The authors can then stand behind the published results, and so can we.”
- **CONFLICT OF INTEREST:** According to The Office of Research Integrity, “it exists if two or more contradictory interests relate to an activity by an individual or an institution. The conflict lies in the situation, not in any behaviour or lack of behaviour of the individual. That means that a conflict of interest is not intrinsically a bad thing.”

PARTICIPANTS AND METHODS

I. Study design:

We conducted a quasi-experimental, pre-post interventional study.

II. Population:

The study targeted postgraduate health science students at the Cadi Ayyad University and resident physicians at the Mohammed VI University Hospital, Marrakesh.

III. Selection criteria:

➤ Inclusion criteria :

- Be a postgraduate, including Ph.D. and second-year master's health science student, at Cadi Ayyad universities
- Be resident physicians at the Mohammed VI University hospital Marrakesh.
- Willing to participate in both the intervention and evaluation.

➤ Exclusion criteria :

- Participants who refuse to give their consent.

IV. Sampling size and type:

We opted for a Non-probabilistic self-selection sampling based on voluntarism.

V. Pre intervention:

1. Preparation of pedagogical supports:

This quasi-experimental study began with an extensive review of available literature and validated questionnaires on research integrity. It was followed by the design of our research protocol, which defines the conceptual framework, study type, population, the intervention procedure, data collection instruments and data analysis plan. Two bilingual questionnaires were formulated for pre and post-evaluation. The pre-intervention questionnaire included a section on identity, research integrity training and experience, knowledge, attitudes and practices. The post-intervention questionnaire contained a section on identity, knowledge, attitudes and satisfaction to evaluate the training program. The questionnaires were then pre-tested by two different individuals before they were validated.

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The intervention consisted of an interactive introductory session, organized in small groups. The pedagogical support consisted of a slide kit addressing the following sections;

1. Definitions of research integrity and fraud
2. Different forms of misconduct
3. The prevalence of misconduct
4. The reasons for misconduct
5. The impact of research misconduct
6. Strategies to address research misconduct

To engage the audience, a series of quizzes and polls were embedded in the presentation using the Mentimeter platform. The sessions were organized for small groups and lasted for 2 hours each.

2. Instruments

Two pre-tested questionnaires (pre and post intervention) were prepared after extensive literature and questionnaire review. The pre-intervention questionnaire included an informed consent, a section on characteristics of participants, research integrity training and experience, questions to evaluate their knowledge and a section to evaluate their attitudes towards research integrity. The post-intervention questionnaire was the same as the pre-intervention questionnaire, except that the participants evaluated their satisfaction with the training program after the intervention.

2.1 Characteristics:

Information was recorded during the intervention including identity, age, gender, profile and study year.

2.2 Knowledge:

To evaluate knowledge, a total of 10 single-choice questions were posed. The questions were on different domains of research misconduct with 2 questions on scientific fraud, 2 on fabrication, 2 on falsification, 2 on conflict of interest and 1 on authorship and scientific misconduct each. Each participant had the option to choose one out of four available responses.

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The instruments used in these study were based on literature review and not on any specific validated questionnaire

2.3 Attitude:

To assess participants' attitude towards research integrity, we used the "Attitude scale: attitude towards RCR practices". The scale contains 21 propositions, with 3 on research ethics regulations, 4 on fabrication and falsification, 3 on plagiarism, 3 on authorship, 3 on conflict of interest and 5 on general attitude towards scientific misconduct. Participants assessed their agreement of attitude towards research integrity based on a Likert scale from 1 to 5 from strongly disagreed to strongly agreed. Negatively worded items are reverse coded so that higher scores consistently reflect more positive attitudes toward responsible research conduct. The total RCR attitude score is calculated by summing or averaging all 21 items. Pre- and post-intervention results are then compared using Wilcoxon test for paired samples and Test T student for paired samples for descriptive statistics.

2.4 Satisfaction:

Holgado-Tello et al.: Training Satisfaction Rating Scale was used to evaluate the satisfaction of the training program. The scale contains 12 items, evaluated from 1 to 5, from strongly disagreed to strongly agreed. The items contained 3 sections, section 1 (3 questions) evaluated objectives and contents of the training, section 2 (6 questions) evaluated the method and training context used and section 3 (3 questions) evaluated the usefulness and overall rating of the training with higher scores indicating greater satisfaction with the training content, organization, and perceived usefulness. The internal consistency of the scale and its sections was assessed using Cronbach's alpha. Satisfaction scores were summarized using descriptive statistics and examined in relation to participants' knowledge and attitude outcomes to explore associations between training satisfaction and the effectiveness of the intervention.

3. Recruitment

The recruitment started with the dissemination of training calls via social media using Google form links which allowed the registration of participants and the application of inclusion and exclusion criteria to confirm the final participation list.

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The eligible participants then received a second email explaining the consent form, objectives of the study, and the procedure of the intervention, which includes two components: (1) training, which includes two in-person interactive sessions on research integrity . (2) Research, includes 2 self-administered questionnaires before and after each intervention.

Participants were urged to commit to attending all components of the study to ensure its validity while our research group also committed to keeping the confidentiality of the participants and to share feedback with the participants at the end of the study. Attendance was coordinated through a doodle link for the participants to confirm their presence and to select suitable dates.

A confirmation email was then sent to participants to specify the time and date of the intervention. The schedule was organized into four groups: two groups composed exclusively of resident physicians, one mixed group of resident physicians and postgraduate health science students, and one group consisting solely of postgraduate health science students. The training sessions were held on December 4, 2025; December 8, 2025; and December 10, 2025, with two groups: the doctoral students group and the residents group.

VI. Intervention

The interventions took place at the department of clinical research centre at the Mohammed VI University Hospital in Marrakech. It started with welcoming of participants followed by a re-explanation of the consent form and the procedure of the intervention.

The participants then answered the pre intervention questionnaire via Google forms which contained 5 categories; identity, research integrity training and experience, knowledge, attitude and practices, after which they benefitted from a 2 hour interactive training program, which reinforced the key concepts of research integrity including plagiarism, authorship, fabrication, falsification and conflict of interest. The session concluded with participant feedback, which allowed reflection on the training content and provided qualitative insights into the intervention's effectiveness.

VII. Post intervention

The post-intervention includes two phases: (1) immediately after the intervention, where the participants answered the post-intervention questionnaire which contained 5 categories; identity, research integrity training and experience, knowledge practice and satisfaction.

(2) The participants will participate in an interactive in-person session after 3 months of the training program after which they will answer the post intervention questionnaire to evaluate their knowledge gained, positive attitude and responsible research practices following the training program. It is important to note that this part will not be included in our study as we will only focus on the post intervention questionnaire results that were answered immediately after the training program.

VIII. Method of Data Analysis:

Data were analysed statistically using Statistical Package for the Social Sciences (SPSS) version 25.0. Data for graphs and tables were entered in Microsoft Excel and Word 2018. Qualitative variables were expressed as numbers and percentages, whilst quantitative variables were presented using the mean, standard deviation or median with range according to the normality of distribution. The normality of score distributions was assessed using the Shapiro-Wilk test. Pre- and post-intervention knowledge and attitude scores were compared using paired Student's t-tests for normally distributed data and Wilcoxon signed-rank tests for non-normally distributed data. The p-value obtained was 0.05.

Ethical and regulatory considerations

The protocol for this study was submitted to the thesis and ethics committee of the Faculty of Medicine and Pharmacy of Marrakech and received their approval to proceed with the investigation (128/2025). The objective of the study, as well as its non-profit nature, was clearly explained to the participants.

Written consent was obtained before and at the beginning of the training program. Throughout our study, we ensured the confidentiality and anonymity of the participants and only

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the members authorized from the research team will had access to the data. The results are presented in an aggregated form that will avoid any form of identification.

IX. CHRONOGRAM:

	2025									
	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Literature review										
Development of research tool (questionnaire and intervention)										
Writing of research protocol										
Recruitment of participants										
Intervention(questionnaires and training program)										
Writing of Introduction and methodology										
Data analysis										
Results presentation										
Discussion and conclusion writing										
Final revision and submission										

RESULTS

I. Sociodemographic characteristics:

The total number of participants was 47.

1. Sex:

Female participants constituted the majority of the sample at 83%, while male participants accounted for only 17%.

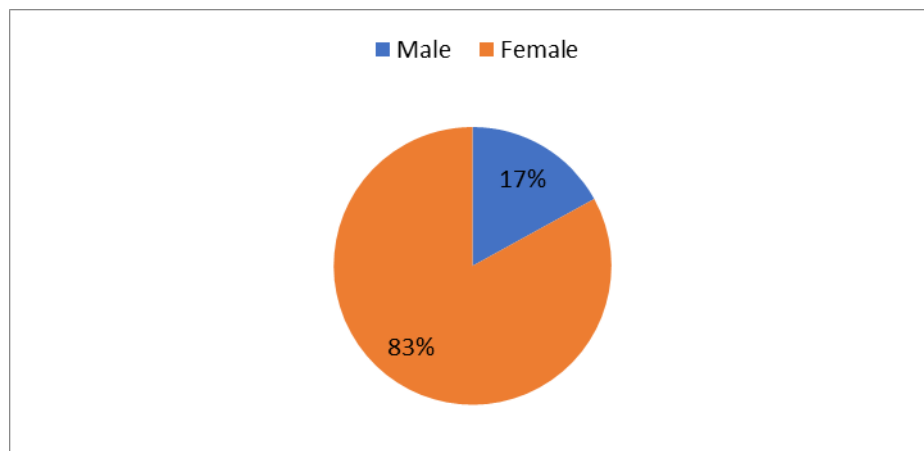


Figure 6: Distribution of participants by gender

2. Profile:

Residents formed the majority of participants at 72.3%, establishing them as the dominant group within the sample, while PhD students accounted for 14.9% and 2nd year master's students represented 12.8%.

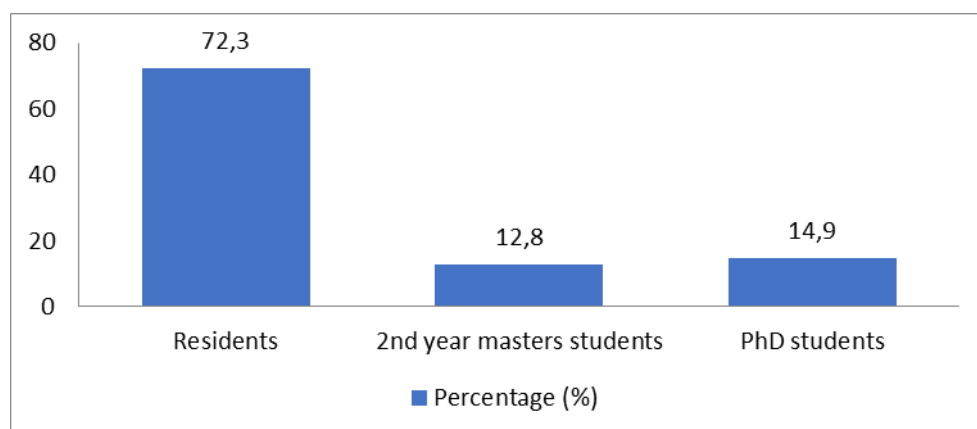


Figure 7: Distribution of participants by profile

3. Year of study:

Most participants were in the early stages of study, with 63.8% in their first year, 25.5% in the second, 8.5% in the third, and only 2.1% in the fifth year

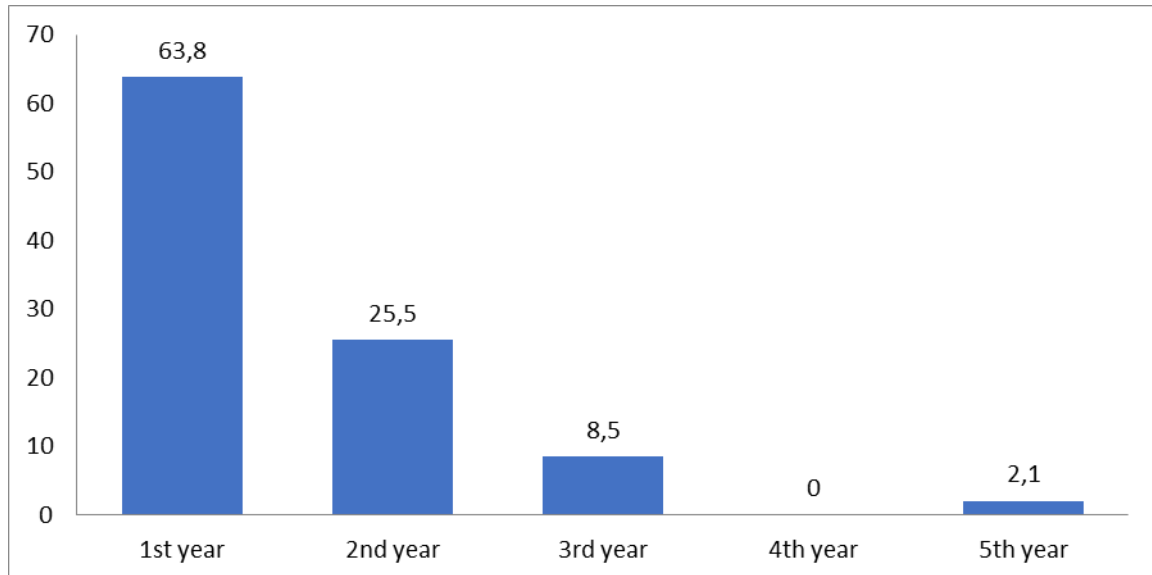


Figure 8: Distribution of participants by year of study.

II. Research integrity training and experience:

1. Designed a research protocol or study plan:

Participants with prior experience in designing a research protocol or study plan comprised the majority at 70.2%, while the remaining 29.8 % had no experience.

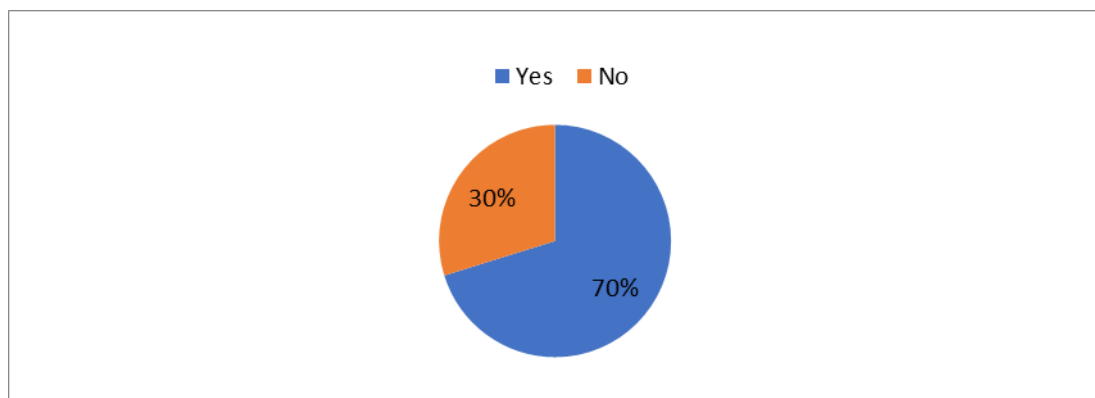


Figure 9: Results of participants' responses to the question related to the design of a research protocol or study plan.

2. Published in a peer reviewed journal:

A minority of participants had published in a peer reviewed journal (12.8%), while the majority (87.2%) had not.

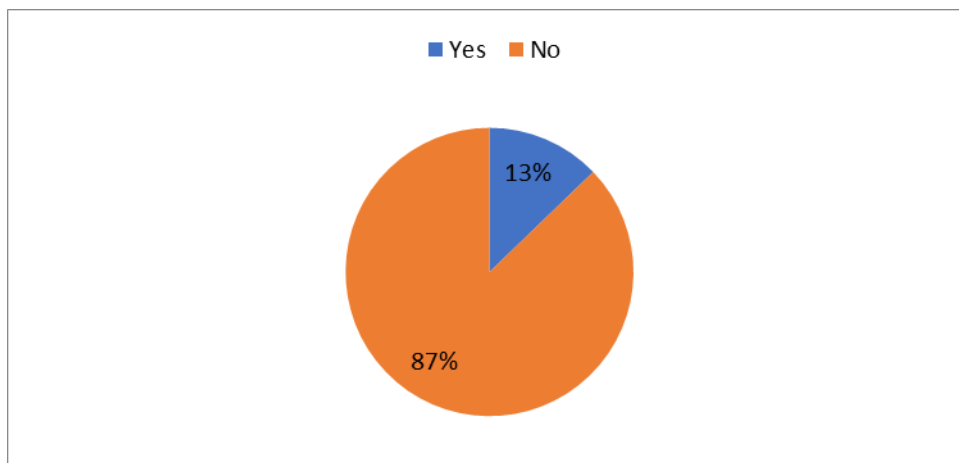


Figure 10: Results of participants' responses to the question related to publication in a peer reviewed journal.

3. Presented research at a conference or seminar:

The greater share of the participants had presented their research at a conference or seminar, representing 68% of the sample, while the remaining 32% had not.

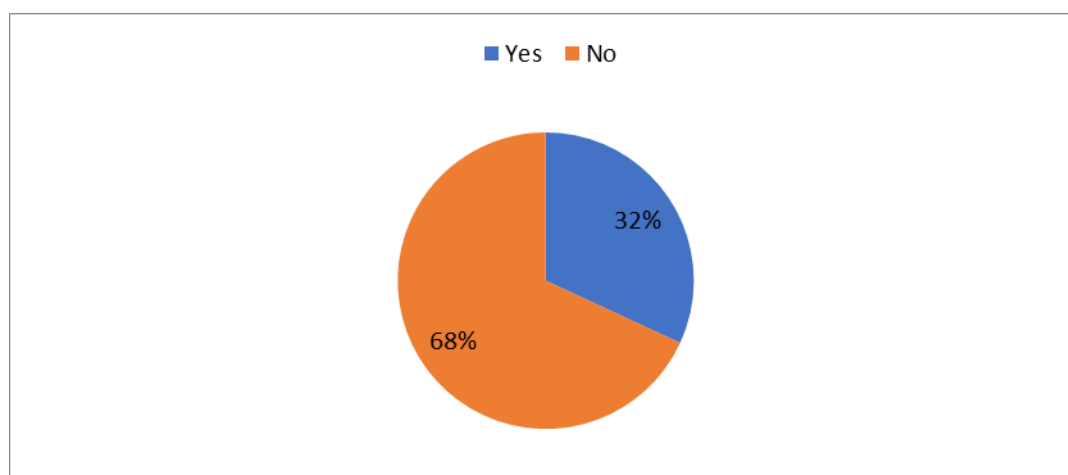


Figure 11: Results of participants' responses to the question related to presenting research at a conference or seminar.

4. Received research integrity training :

Only a small fraction of participants had received training on research integrity (8.5%), while the vast majority (91.5%) lacked such exposure

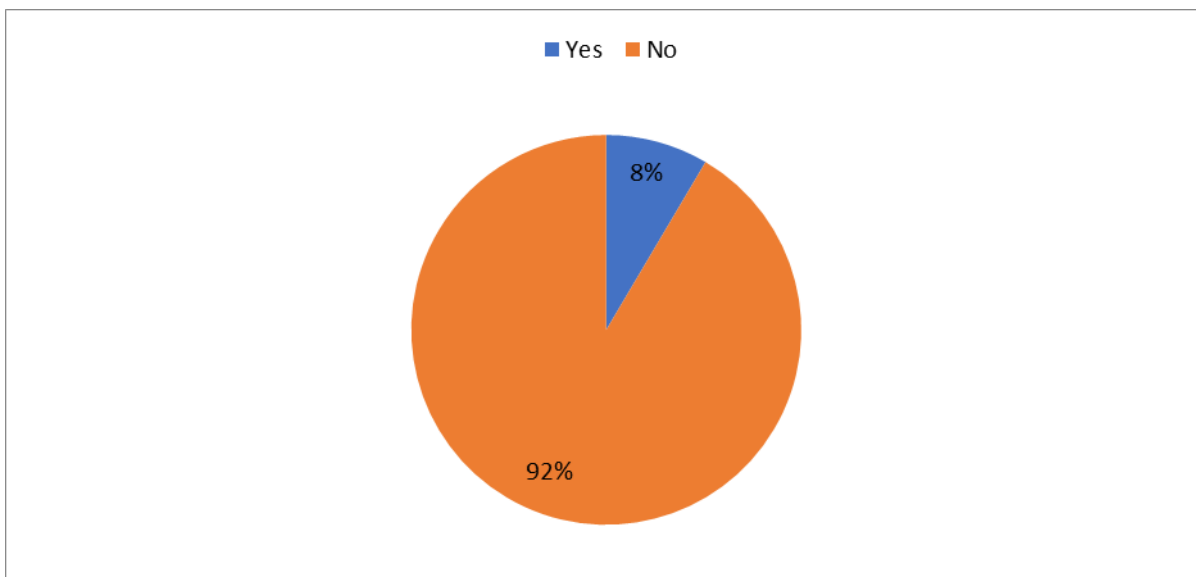


Figure 12: Results of participants' responses to the question related to receiving research integrity training.

5. Trained, scientific integrity, research misconduct and disciplinary measures:

A large proportion of participants, 73.2% disagreed with the proposition that they feel sufficiently trained in research ethics, while 27.7% agreed. On understanding of research integrity and knowledge of scientific misconduct, 63.8% disagreed and 36.2% agreed. A similar pattern appeared regarding knowledge of disciplinary measures related to scientific misconduct, where 59.6% disagreed and 40.4% agreed.

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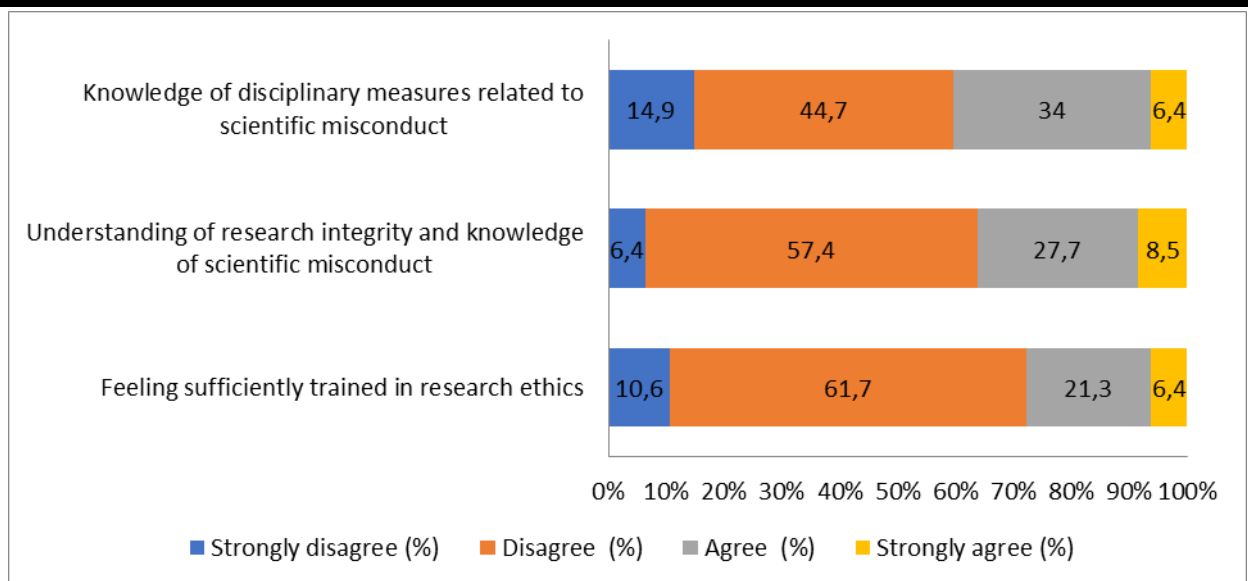


Figure 13: Results of participants' responses to the question related to Trained, scientific integrity, research misconduct and disciplinary measures

III. Knowledge:

1. Scientific fraud:

Before the intervention, a quarter of participants (25.5%) were able to identify that scientific fraud represents a violation of professional conduct and ethics, while the remaining 74.5% selected incorrect alternatives. After the intervention, correct identification declined further to 14.9%, with 85.1% answering incorrectly.

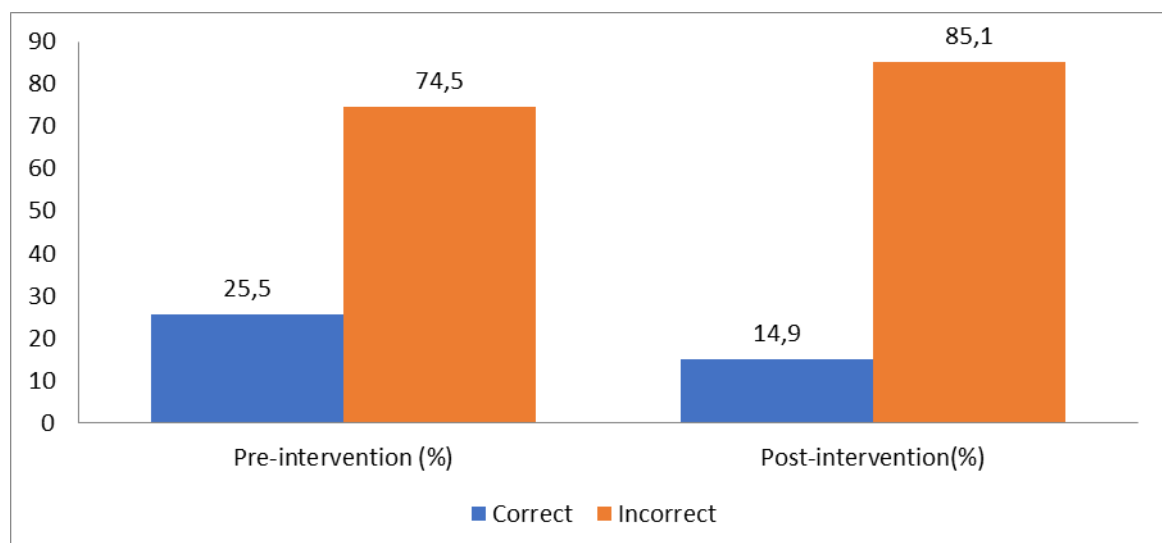


Figure 14: Results of participants' responses to the question related to scientific fraud

2. Data falsification:

On data falsification, 36.2% of participants correctly identified it as the alteration or omission of research results before the intervention, while 63.8% selected incorrect options. After the intervention, correct responses rose to 59.6%, and incorrect responses declined to 40.4%.

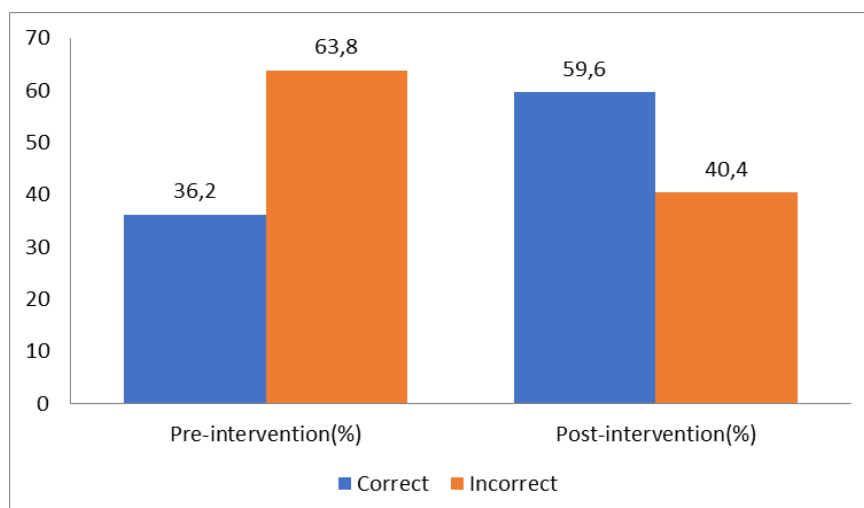


Figure 15: Results of participants' responses to the question related to data falsification.

3. Data fabrication:

Regarding data fabrication, 27.7% of participants initially recognized that it involves the creation of fictitious research data, while 72.3% selected incorrect alternatives. Following the intervention, recognition improved markedly, with 57.4% identifying the correct definition and 42.6% answering incorrectly.

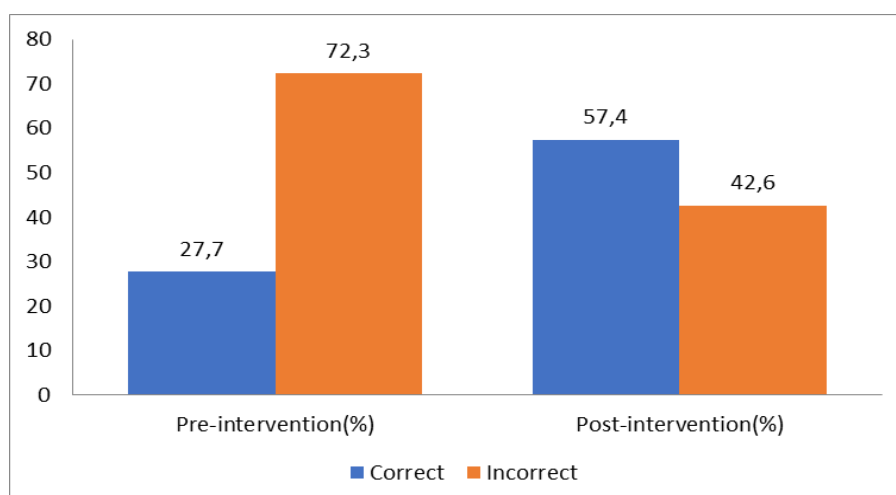


Figure 16: Results of participants' responses to the question related to data fabrication.

4. Definition of conflict of interest:

Prior to the intervention, only 31.9% of participants recognized that it occurs when the researcher is torn between personal research interests and the duty to respect participants, compared with 68.1% who chose incorrect options. After the intervention, nearly half (48.1%) selected the correct definition, while just over half (51.9%) continued to respond incorrectly.

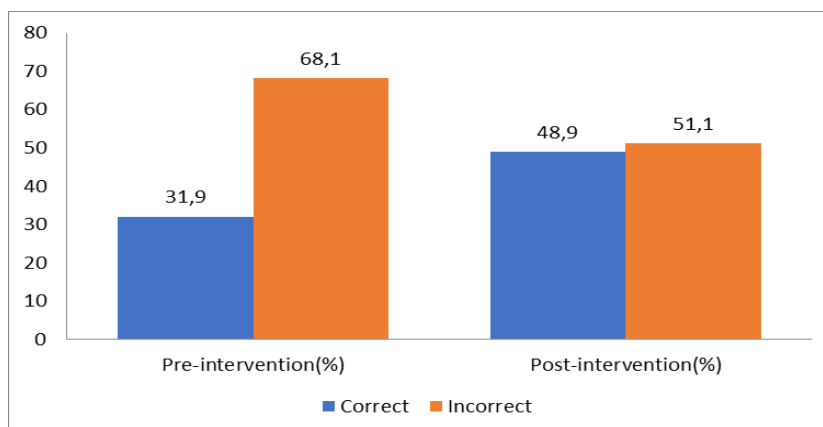


Figure 17: Results of participants' responses to the question related to the definition of conflict of interest.

5. Conflicts of interest in the context of research:

In relation to conflict of interest in the context of research, 44.7% of participants correctly recognized that it occurs when a researcher's personal interests influence their behaviour, while 55.3% selected incorrect alternatives before the intervention. After the intervention, correct identification rose sharply to 74.5%, with only 25.5% answering incorrectly..

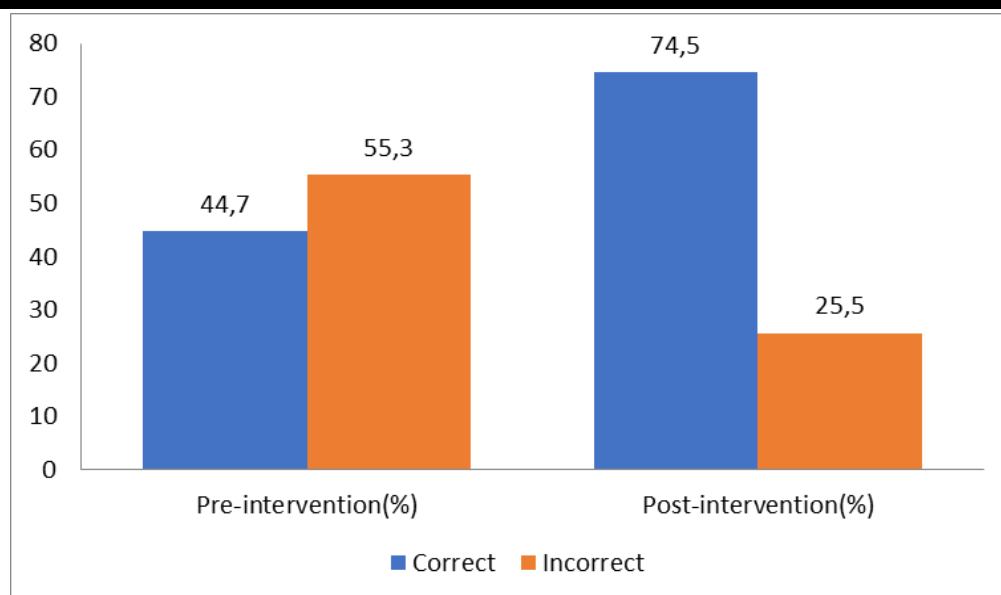


Figure 18: Results of participants' responses to the question related to conflict of interest in the context of research.

6. Who should be listed as authors:

At the outset, 76.6% of participants selected the correct response, identifying that authorship should be limited to those who contributed to the conception of the research, while 23.4% chose incorrect alternatives. The same proportions were recorded after the intervention, with 76.6% continuing to answer correctly and 23.4% incorrectly.

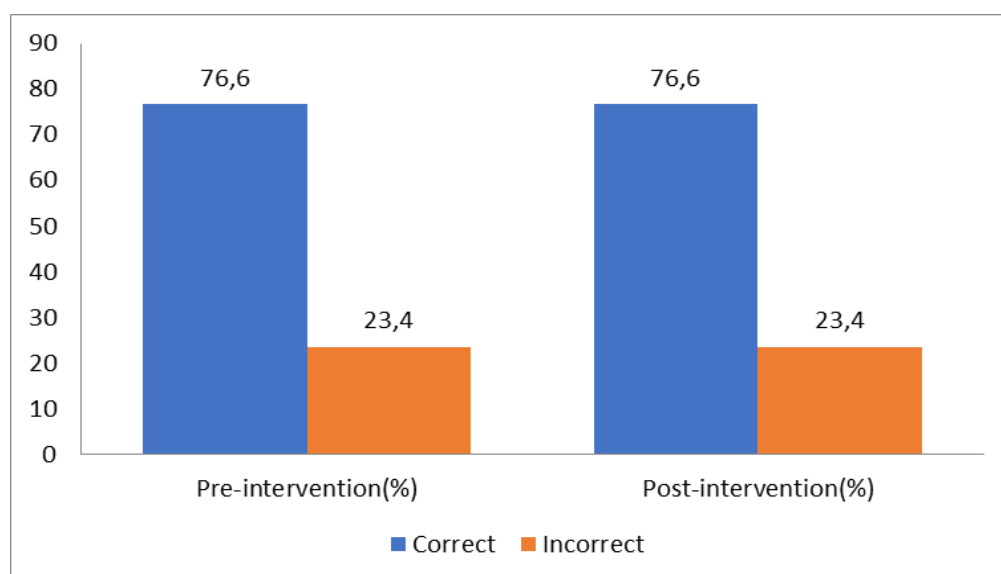


Figure 19: Results of participants' responses to the question related to who should be listed as author.

7. Scientific fraud in research:

In the domain of research, 68.1% of participants initially identified fraud correctly as cheating, while 31.9% incorrectly selected other options. After the intervention, correct responses decreased slightly to 66.0%, with 34.0% choosing incorrect alternatives.

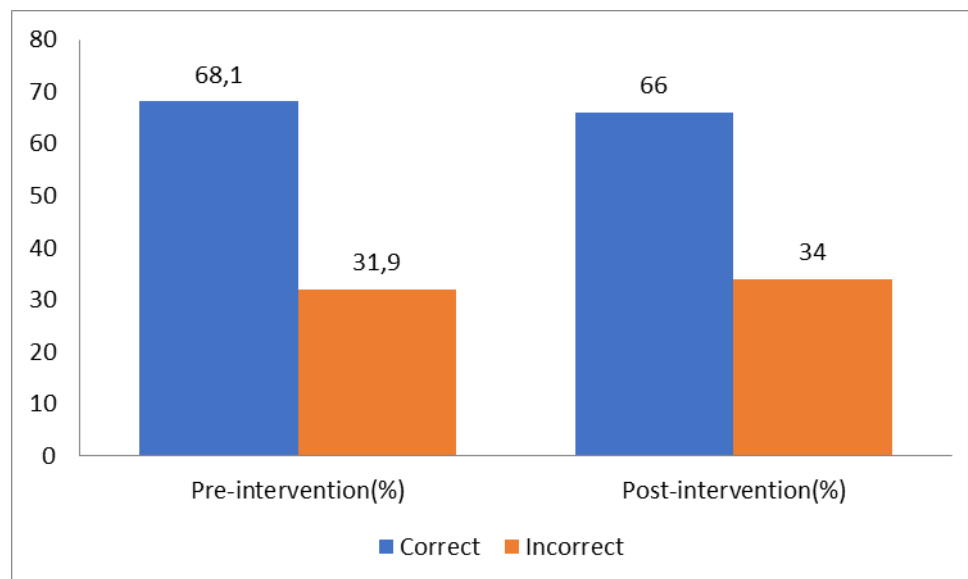


Figure 20: Results of participants' responses to the question related to scientific fraud in research.

8. Among the forms of scientific misconducts:

In relation to this item, 38.3% of participants initially gave the correct response, identifying nondisclosure of conflicts of interest as misconduct, while 61.7% selected incorrect options. After the intervention, the proportion of correct answers rose to 42.6%, and the share of incorrect responses declined to 57.4%.

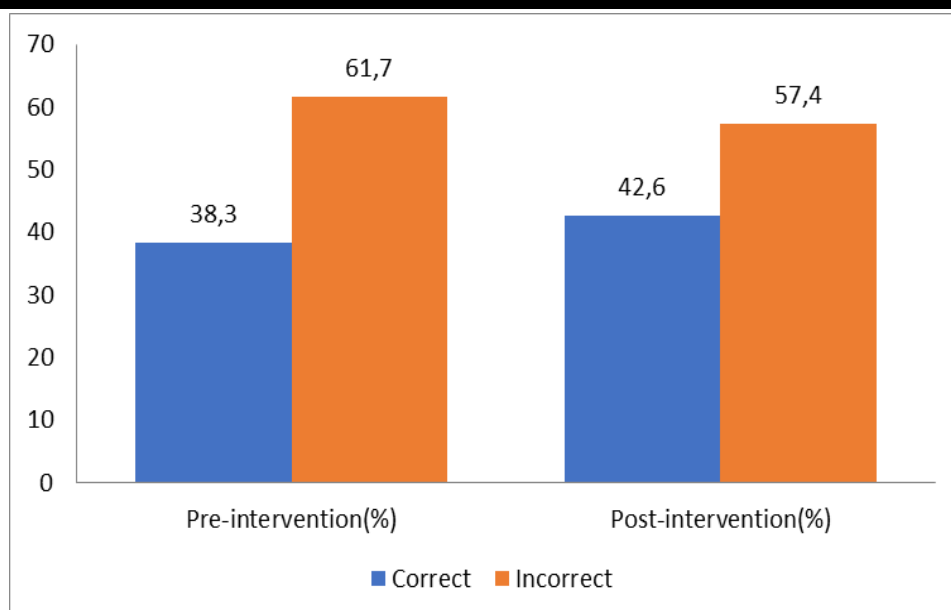


Figure 21: Results of participants' responses to the question related to among the forms of scientific misconduct.

9. The creation of research data:

Almost half of participants (48.9%) initially recognized that the creation of research data corresponds to fabrication, while 51.1% incorrectly selected other options. After the intervention, the proportion of correct answers increased substantially to 70.2%, with incorrect responses falling to 29.8%.

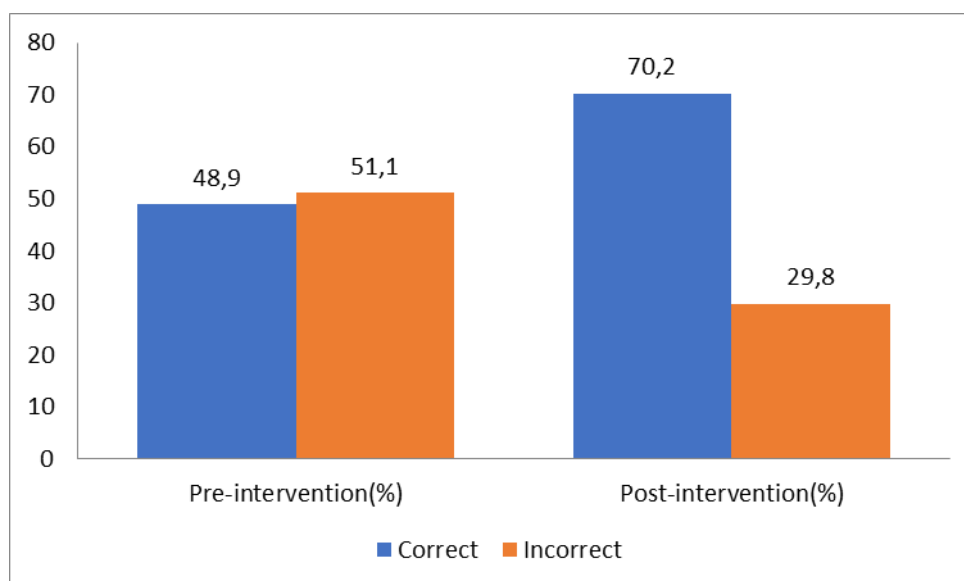


Figure 22: Results of participants' responses to the question related to creation of research data.

10. The modification of research results:

Before the intervention, 61.7% of participants correctly identified falsification as the act of modifying results to prove a hypothesis, while 38.9% selected incorrect options. After the intervention, correct responses increased to 66.0%, with incorrect answers declining to 34.0%.

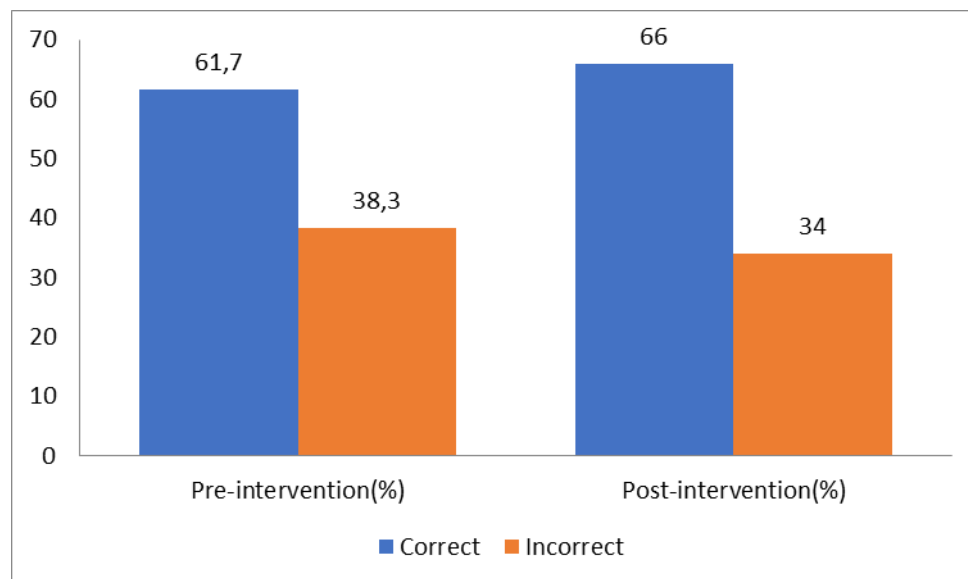


Figure 23: Results of participants' responses to the question related to the modification of research data.

11. Knowledge score on 10 questions evaluating knowledge on research integrity before and after intervention:

Significant improvements were observed on 4 of the 10 questions on knowledge regarding research integrity, notably on data falsification ($p=0.019$), data fabrication ($p=0.009$), conflict of interest in research ($p=0.003$), and on creation of data ($p = 0.021$). (Table1). There was also improvement on 4 other questions on scientific fraud, definition of conflict of interest, forms of misconduct and modification of research data to support a hypothesis but they were not statistically significant.

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Table 1: 10 questions evaluating knowledge on research integrity before and after intervention

Pre-intervention	Correct answer post-intervention n(%)	Incorrect answer post-intervention n(%)	p
Scientific fraud			0.302
- Correct	02(16.7)	10(83.3)	
- Incorrect	05(14.3)	30(85.7)	
Data falsification			0.019
- Correct	13(76.5)	04 (23.5)	
- Incorrect	15 (50.0)	15(50.0)	
Data fabrication			0.009*
- Correct	07(53.8)	06(46.2)	
- Incorrect	20(58.8)	14(41.2)	
Definition of the conflict of interest			0.077
- Correct	11(73.3)	04(26.7)	
- Incorrect	12(37.5)	20(62.5)	
Conflicts of interest in the context of research			0.003*
- Correct	18(85.7)	03(14.3)	
- Incorrect	17(65.4)	09(34.6)	
Who should be listed as authors			1.000
- Correct	31(86.1)	05(13.9)	
- Incorrect	05(45.5)	06(54.5)	
Scientific fraud in research			1.000
- Correct	23(71.9)	09(28.1)	
- Incorrect	08(53.3)	07(46.7)	
Among the forms of scientific misconduct			0.774
- Correct	13(72.2)	05(27.8)	
- Incorrect	07(24.1)	22(75.9)	
Creation of research data			0.021
- Correct	20(87)	03(13)	
- Incorrect	13(54.2)	11(45.8)	
The modification of research results to prove his hypothesis			0.804
- Correct	22(75.9)	7(24.1)	
- Incorrect	09(50)	09(50)	

* Tests du khi-carré

12. General knowledge score before and after the intervention.

The mean general knowledge score was initially below average at 4.60 ± 2.08 before the intervention, after the intervention there was notable improvement, with the mean general score increasing to 5.77 ± 2.66 . There was a statistical significant improvement in the general knowledge score ($p=0.009^*$),

Table 2: General knowledge score before and after the intervention.

	Before the intervention (mean $\pm$ SD)	After the intervention (mean $\pm$ SD)	p
Knowledge			0.009*
	4.60 $\pm$ 2.08	5.77 $\pm$ 2.66	

*Test t student for paired samples

IV. Attitude:

1. Attitude towards responsible conduct of research

The majority of participants expressed negative attitudes toward unethical research practices across most items assessing acceptability, with a clear improvement observed after the intervention. Specifically, participants increasingly disagreed with the acceptability of misconduct-related statements following the training, particularly those related to data fabrication, falsification, plagiarism, inappropriate authorship, and undisclosed conflicts of interest. For example

- On the statement “Making up research data”, 85% of participants disagreed before the intervention compared to over 97% after.
- On “Publishing results that belong to someone else”, approximately 83% of participants disagreed before the intervention while over 97% disagreed after
- On authorship, 74% initially disagreed with “Giving authorship credit to someone who has not contributed substantively to a manuscript” compared to about 96% after.
- Disagreement of “Inappropriately altering or suppressing research results in response to pressure from a commercial or not-for-profit funding source” went from about 94% before the intervention to 100% after

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Table 3: Attitude towards responsible conduct of research

Items	Before or after the intervention	Strongly disagree n(%)	Disagree n(%)	Neutral n(%)	Agree n(%)	Strongly agree n(%)
Re_1	Before	29 (61.7)	07 (14.9)	05(10.6)	02 (4.3)	04 (8.5)
	After	34 (72.3)	04 (8.5)	04 (8.5)	03 (6.4)	02 (4.3)
Re_2	Before	37 (78.7)	05 (10.6)	0	01 (2.1)	04 (8.5)
	After	40 (85.1)	05 (10.6)	01 (2.1)	01 (2.1)	0
Re_3	Before	36 (76.6)	03 (6.4)	04(8.5)	01 (2.1)	03 (6.4)
	After	39 (83.0)	05 (10.6)	01(2.1)	02 (4.3)	0
DFF_1	Before	31 (66.0)	09 (19.1)	02(4.3)	01 (2.1)	04 (8.5)
	After	41 (87.2)	05 (10.6)	0	0	01 (2.1)
DFF_2	Before	36 (76.6)	05 (10.6)	02(4.3)	01 (2.1)	03 (6.4)
	After	41 (87.2)	03 (6.4)	02 (4.3)	0	01 (2.1)
DFF_3	Before	36 (76.6)	05 (10.6)	02 (4.3)	01 (2.1)	03 (6.4)
	After	37 (78.7)	04 (8.5)	04 (8.5)	02 (4.3)	0
DFF_4	Before	28 (59.6)	09 (19.1)	05(10.6)	02 (4.3)	03 (6.4)
	After	36 (76.6)	07 (14.9)	03 (6.4)	0	01 (2.1)
Plag_1	Before	30 (63.8)	09(19.1)	02 (4.3)	03 (6.4)	03 (6.4)
	After	41 (87.2)	05(10.6)	01 (2.1)	0	0
Plag_2	Before	34 (72.3)	08 (17.0)	01 (2.1)	03 (6.4)	01 (2.1)
	After	40 (85.1)	06 (12.8)	01 (2.1)	0	0
Plag_3	Before	37 (78.7)	04 (8.5)	03(6.4)	01(2.1)	02 (4.3)
	After	41 (87.2)	03 (6.4)	02 (4.3)	01 (2.1)	0
Authorship_1	Before	26 (55.3)	09 (19.1)	06(12.8)	04(8.5)	02 (4.3)
	After	39 (83.0)	06 (12.8)	02 (4.3)	0	0
Authorship_2	Before	29 (61.7)	10 (21.3)	05(10.6)	02 (4.3)	01 (2.1)
	After	37 (78.7)	05 (10.6)	02 (4.3)	01 (2.1)	02 (4.3)
Authorship_3	Before	33 (70.2)	08 (17.0)	03 (6.4)	02 (4.3)	01 (2.1)
	After	36 (76.6)	07 (14.9)	03 (6.4)	01 (2.1)	0
COI_1	Before	27 (57.4)	09 (19.1)	06 (12.8)	03 (6.4)	02 (4.3)
	After	36 (76.6)	08 (17.0)	01 (2.1)	02 (4.3)	0
COI_2.	Before	35 (74.5)	08 (17.0)	01 (2.1)	01 (2.1)	02 (4.3)
	After	41 (87.2)	06 (12.8)	0	0	0
COI_3.	Before	38 (80.9)	06 (12.8)	0	01 (2.1)	02 (4.3)
	After	43 (91.5)	04 (8.5)	0	0	0

2. General attitude towards research misconduct.

The participants predominantly demonstrated negative attitude towards research misconduct in general before the intervention, with improvements noted after the intervention. Participants increasingly agreed with more ethical conduct especially after the intervention. For example

- Agreement with “I’m concerned about the amount of misconduct that occurs” increased from 61.7% to 74.4% after the intervention.
- On if “investigator should report instances of research misconduct”, agreement rose from 93.7% to 95.7%
- Disagreement increased from 29.8% to 34% for the statement that “The responsibility for misconduct lies with the principal investigator only”

Table 4: General attitude towards research misconduct.

Items	Before or after the intervention	Strongly disagree n(%)	Disagree n(%)	Neutral n(%)	Agree n(%)	Strongly agree n(%)
SM_1	Before	01(2.1)	05(10.6)	10(21.3)	20(42.6)	11(23.4)
	After	02(4.3)	03(6.4)	07(14.9)	09(19.1)	26(55.3)
SM_2	Before	03 (6.4)	11 (23.4)	06(12.8)	20(42.6)	07 (14.9)
	After	08 (17.0)	08 (17.0)	02 (4.3)	14(29.8)	15 (31.9)
SM_3	Before	0	0	03 (6.4)	20 (42.6)	24 (51.1)
	After	01(2.1)	01 (2.1)	0	16 (34.0)	29 (61.7)
SM_4	Before	0	0	02 (4.3)	14 (29.8)	31 (66.0)
	After	01 (2.1)	0	01 (2.1)	12 (25.5)	33 (70.2)
SM_5	Before	0	01 (2.1)	0	10 (21.3)	36 (76.6)
	After	0	01 (2.1)	0	07 (14.9)	39 (83.0)

3. Attitude score before and after the intervention:

There was significant improvement on 11 of the 21 attitude score, 4 on data fabrication and falsification, notably on Making up research data ($p = 0.008$), changing research data without mentioning it ($p = 0.031$), dropping “outliers” without mentioning it ($p = 0.014$), Selecting only data that support your hypothesis ($p = 0.027$). 3 were also noted on all the plagiarism items: publishing results that belong to someone else ($p = 0.012$), using someone else’s words or ideas

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without credit ($p = 0.039$), submitting a manuscript to a journal already published elsewhere ($p = 0.001$). 2 were on authorship, notably, giving authorship credit to someone without contribution ($p = 0.002$), Allowing your name on papers without contribution ($p = 0.003$), 1 was on conflict of interest markedly on inappropriately altering/suppressing results under pressure ($p = 0.041$) and 1 was on general attitudes towards scientific misconduct notably on concern about misconduct occurrence ($p = 0.005$).

There was improvement in the rest of the items but they were not statistically significant.

Table 5: Mean attitude score before and after the intervention

	Before the intervention (mean $\pm$ SD)	After the intervention (mean $\pm$ SD)	p
Conducting research involving human subjects without prior approval from a Review Ethics Committee	4.17 $\pm$ 1.29	4.38 $\pm$ 1.15	0.373
Use of confidential information about research subjects without their authorisation	4.49 $\pm$ 1.20	4.79 $\pm$ 0.59	0.064
Not obtaining proper informed consent from participants	4.45 $\pm$ 1.16	4.72 $\pm$ 0.71	0.700
Making up research data	4.32 $\pm$ 1.22	4.81 $\pm$ 0.65	0.008*
Changing research data without mentioning it	4.49 $\pm$ 1.12	4.77 $\pm$ 0.73	0.031*
Dropping "outliers" without mentioning it	4.21 $\pm$ 1.20	4.62 $\pm$ 0.82	0.014*
Selecting only those data that support your hypothesis	4.28 $\pm$ 1.21	4.64 $\pm$ 0.79	0.027*
Publishing results that belong to someone else	4.51 $\pm$.975	4.85 $\pm$ 0.42	0.012*
Using someone else's words or ideas without giving proper credit	4.55 $\pm$ 1.02	4.83 $\pm$ 0.43	0.039*
Submitting a manuscript to a journal that you already published in another journal	4.13 $\pm$ 1.19	4.79 $\pm$ 0.62	0.001*
Giving authorship credit to someone who has not contributed substantively to a manuscript	4.36 $\pm$ 0.99	4.79 $\pm$ 0.51	0.002*
Denying authorship credit to someone who has contributed substantively to a manuscript	4.49 $\pm$ 0.95	4.57 $\pm$ 0.99	0.506

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Allowing your name to be put on papers to which you have made no reasonable contribution	4.19±1.15	4.66±0.70	0.003*
Awareness of a conflict of interest (e.g., you have a financial interest with a drug company, and you are conducting a study for them) and did not disclose it to either the ethics committee or a journal	4.34±1.20	4.66±0.73	0.065
Compromising the rigor of a study's design or methodology in response to pressure from a commercial or not for profit funding source	4.55±0.97	4.87±.34	0.100
Inappropriately altering or suppressing research results in response to pressure from a commercial or not for profit funding source	4.64±0.94	4.90±0.28	0.041*
I'm concerned about the amount of misconduct that occurs	2.26±1.01	1.85±1.16	0.005*
The responsibility for misconduct lies with the principal investigator only	3.36 ±1.19	3.43 ±1.51	0.766
Investigators should report instances of research misconduct	1.55±.612	1.49±0.80	0.386
Investigators should declare conflicts of interest to the appropriate officials	1.38±0.57	1.38±0.74	0.888
I should monitor my trainees' work to ensure that they are developing into responsible researchers	1.28±0.58	1.21±.549	0.614

***wilcoxon test for paired samples**

4. Descriptive statistics (mean ±SD) of the different items of the attitude questionnaire.

There was a significant improvement in the mean general attitude towards scientific misconduct with mean scores decreasing (8.55 ± 1.79 to 8.15 ± 2.36), in the acceptability of responsible conduct of research practices (70.17 ± 14.34 to 75.66 ± 07.27) and in the total attitude score (85.62 ± 14.80 to 91.51 ± 8.25). There were statistical significant improvement on all 3 sections with all p values < 0.001*

Table 6: Descriptive statistics (mean $\pm$ SD) of the different items of the attitude questionnaire.

	Before the intervention (mean $\pm$ SD)	After the intervention (mean $\pm$ SD)	p
Acceptability of Responsible Conduct of Research practices			<0,001*
	70.17 $\pm$ 14.34	75.66 $\pm$ 07.27	
General attitudes toward scientific misconduct			<0,001*
	8.55 $\pm$ 1.791	8.15 $\pm$ 2.359	
Total score			<0,001*
	85.62 $\pm$ 14.80	91.51 $\pm$ 8.25	

* wilcoxon test for paired samples

V. Satisfaction:

Most participants strongly agreed with Usefulness and Overall Evaluation, with at least 78.7% across all four items. The remaining participants agreed, and only 2.1% were neutral about one of the items. On Training Methods and Interactions, overall agreement was above 78.7%, with 8,5% neutral on one item and 2.1% disagreeing that the training enabled them to share professional experiences with colleagues.

Over 80% of participants agreed with the course design and objectives. 4.3% were neutral on 2 of the 3 items, while 4.3% disagreed that the length of the course was adequate for the objectives and content.

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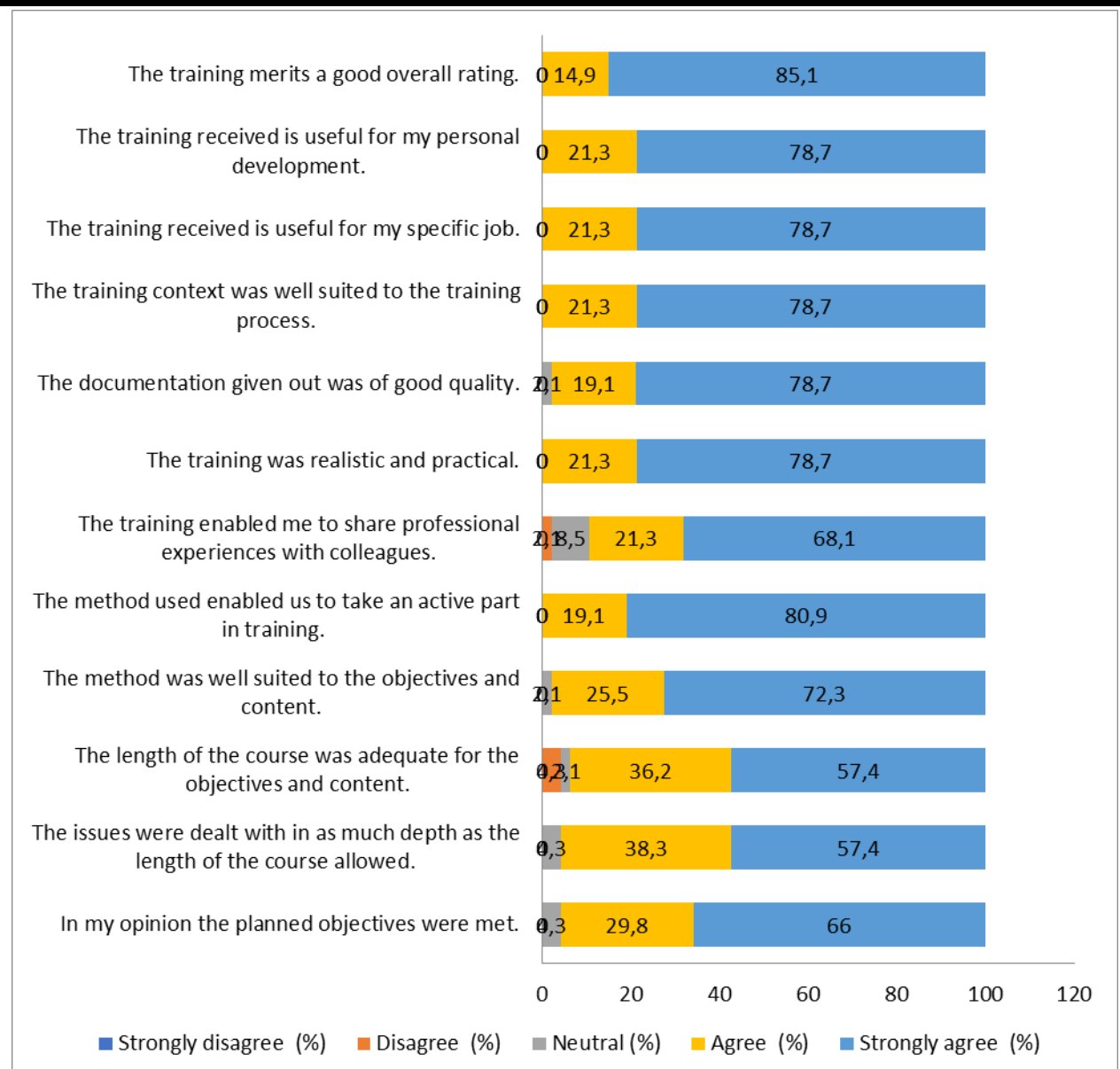


Figure 24: 12 statements rated on a scale of 1 (strongly disagree) to 5 (strongly agree) evaluation satisfaction of the training program .

DISCUSSION

I. Summary of key findings

The objective of our study was to show how a training program can improve the knowledge and attitudes of health science postgraduate students regarding research integrity. The results of our study demonstrate a significant improvement in knowledge related to falsification, fabrication, conflict of interest, and the creation of research data. Other domains, such as plagiarism, authorship, and scientific fraud as a whole, did not show measurable change. The difference in results may suggest that some domains are more responsive, while others require a more extensive training program.

There was also a significant shift in attitude towards responsible conduct of research with the participants being less tolerant to certain types of research misconduct such as fabrication, falsification and conflict of interest. The outcome of these results suggests that a training program can go a long way in improving both knowledge and attitude regarding research integrity.

II. Discussion of Principal Results

1. Impact of the training program on knowledge regarding research integrity:

Our study showed significant improvement on the overall knowledge of our participants after the training program. As shown in Table 12, the mean general knowledge score increased from 4.60 ± 2.08 pre intervention to 5.77 ± 2.66 post intervention with the difference reaching statistical significance ($p = 0.009$). This results points towards the fact that the training program was effective in improving the participants overall understanding of research integrity.

The overall gain in knowledge is particularly remarkable given the short duration of the training program, which suggests that even a short, focused training program can significantly close knowledge gaps in responsible conduct of research. This evidence aligns with previous literature that structured integrity training can improve learners' understanding of responsible conduct of research.

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In comparison with previous studies, Ajuwon and Kass(18) also reported a significant improvement of knowledge of the principles of research ethics with the mean scores for knowledge rising from 0.67 out of 3 points at pre-test to 2.25 at post-test and a difference that reached a statistical significant($p < 0.05$) after a research ethics training workshop.

In a longitudinal design by Abdi et al.(19) where over 1000 starting PhD students from various disciplines were surveyed regarding knowledge, attitude and behaviour before, immediately after and 3 months after a compulsory 3h course. Significant increases in knowledge scores at the post test (4.27) compared to pre-test (3.83) was observed in the knowledge of the participant immediately after the 3h course.

The study from Aggarwal et al.(20) also reported a significant increase in knowledge regarding research ethics after both an onsite and online course. The on-site Research Ethics course, median score increased from 69% to 83% ($p=0.005$), and for the on-line Research Ethics course from 62% to 80% ($p<0.001$). This study also demonstrates that a a course on research ethics can significantly increase knowledge.

A study by Powell et al.(21) also indicate that a short-term RCR courses can improve knowledge, awareness and attitudes toward research ethics, though long-term effectiveness requires further evaluation, reported significant improve in knowledge of participants partaking in a training course on responsible conduct of research with performance on the knowledge questions improved significantly ($p<0.05$) between pre and post students scores.

Although the general knowledge score confirms the effectiveness of the training program, an analysis of individual research integrity domains was conducted to identify differential knowledge gains and to better understand the strengths and limitations of the short training intervention.

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Table 7: Summary of results on general knowledge from our study compared to previous studies

Author	Year	Study design / Setting	Sample	Measuring tools	Results
Our study	2025	pre-post quasi-experimental, Morocco	47 postgraduate health science students	Structured pre-post questionnaire on general knowledge on responsible conduct of research.	Mean general knowledge score increase showing significant improvement in knowledge on research integrity.
Ajuwon & Kass	2008	Research ethics training workshop, Nigeria	60 clinicians & scientists	Pre/post-test questionnaires on ethics knowledge	Significant improvement in knowledge of research ethics principles post-training; participants reported greater confidence in conducting ethically acceptable research.
Abdi et al.	2021	Content analysis of PhD-level RI education	11 universities (LERU network)	Curriculum review & survey of training programs	Structured RI education improved awareness and attitudes; effectiveness varied by duration, format, and institutional support.
Aggarwal et al.	(Year not specified)	Institutional RI course for early-career researchers	100 participants	Surveys on perceptions & experiences of RI training	Participants reported improved understanding of RI principles and positive attitudes toward responsible conduct
Powell et al.	2007	Evaluation of RI training policies and workshops,	147 participants	Thematic analysis of training experiences	RI education increased awareness and knowledge.

2. Impact of the Training Program on Knowledge of Specific Domains:

To better understand the impact of the training program on specific domains of research integrity, we explored changes in individual aspects of research misconduct. Studies evaluating research integrity or responsible conduct of research training commonly use pre-post designs to assess changes in knowledge of specific domains of misconduct related topics, we will also be using this trend to deeper explore the impact of the training program. The results from our study showed a significant statistical relationship between the training program and certain aspects of research integrity such as fabrication, falsification and conflict of interest.

2.1 Fabrication:

Fabrication is making up data or results and recording or reporting them.

The findings from our study revealed low level of knowledge before the intervention among our participants. The proportion of correct responses post-intervention increased among participants regardless of their pre-intervention performance, reflecting an overall enhancement in understanding of data fabrication. Our results show statistical significance between the training program and the knowledge on fabrication.

- Only 27.7% were able to identify what fabrication was before the intervention, while over twice the initial figure (54.7%) were able to answer correctly after the intervention.
- After the intervention, a total of 20 participants (58.8%) answered correctly on fabrication after initially answering incorrectly.
- Correct responses improved from 48.9% to 70.2% on creation of data after the intervention with 07(24.1%) answering correctly after initially answering incorrectly.
- Our results demonstrate significant improvement on knowledge regarding fabrication.

Similar to our study, Chen et al.(22) indicated significant improvement in residents' knowledge on definition of fabrication after a case based learning course on research integrity. A study by Mayyas et al.(23) also reported a significant improvement in participants' abilities to

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identify fabrication as research misconduct after a one day workshop on essential concepts in writing and important ethical aspects associated with writing.

2.2 Falsification:

Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.

Our study revealed that participants had limited knowledge on falsification initially. Following the intervention, the proportion of correct responses increased indicating a general improvement in understanding of data falsification. There was statistical significance between the training program and knowledge.

- [22] Only 36.2% of the participants answered correctly on falsification initially, while it improved to 59.6% after the intervention.
- A total of 15 (50.0%) participants were able to identify falsification after initially answering wrong before the intervention.
- Our results show important improvement in knowledge on falsification.

In comparison, Chen et al.(22) also reported a significant improvement of resident's ability to identify falsification after a case based learning course on research integrity. Greco et al.(12) also reported significant improvement of knowledge on falsification of early researchers after an institutional training course on research integrity.

2.3 Conflict of interest:

Conflicts of interest are "situations in which financial or other personal considerations may compromise, or have the appearance of compromising, an investigator's judgement in conducting or reporting research."

There was improvement in participants knowledge on the definition of conflict of interest but it was not statistically significant with 12(37.5%) of participants answering correctly after initially answering incorrectly before the intervention. These results may indicate an effectiveness of the training program but may suggest improvement in the time and content of the training to address the gaps in knowledge.

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On conflicts of interest in the context of research, there was significant improvement in the knowledge of our participants.

- Almost half of the participants (44.7%) answered correctly before the intervention compared to 74.5% after the intervention.
- A total of 17(65.4%) participants answered correctly after the intervention after initially answering incorrectly.
- This data indicates that a training program can improve the knowledge on conflict of interest.

Similar to our findings, Chen et al.(22) reported a major improvement on knowledge regarding conflict of interest. In other studies, Mayyas(23), Greco et al.(12) and Fabbri et al.(24) also all reported significant improvement in knowledge regarding conflict of interest after their respective training courses.

2.4 Authorship:

There was no improvement on knowledge regarding authorship with exactly 76.6% answering correctly before and after the intervention. This may indicate high level base line knowledge on authorship, or that perceptions of authorship may be deeply influenced by disciplinary norms and institutional culture. There was no statistically significant relationship between the training program and knowledge on authorship.

This is consistent with Greco et al.(12) study on early researchers attending an institutional training program on research integrity, where participants were found to have moderate baseline knowledge on authorship and there was only a slight improvement after the training course with no statistical significant improvement.

2.5 Scientific fraud:

The baseline knowledge on scientific fraud was generally low among our participants.

- On scientific fraud in general, only 25.5% of participants were able to answer correctly before the intervention compared to 14.9% after the intervention.
- Only 38.3% of Participants were able to identify the forms of scientific misconduct initially compared to 42.6% after the intervention.

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- Initially 68.1% of participants were able to identify what scientific fraud in research corresponds to, while the numbers dropped to 66% after the intervention,

There was no statistical signification between the training program and the knowledge on scientific fraud.

These finding are in line with Jin et al. where only 38% correctly identified scientific fraud as intentional misconduct. Kennedy also highlighted that fraud is often poorly understood by researchers, with many institutions lacking clear training to distinguish fraud from mistakes.

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Table 8: Summary of impact of the training program on specific domain of knowledge.

Author	Year	Study design	Sample	Measuring tools	Results
Chen et al.	2025	Controlled before after (case based vs. lecture)	Graduate students	Pre post survey on misconduct definitions	Case based learning produced stronger gains across domains in fabrication, falsification.
Mayyas & Alzoubi	2022	Cross-sectional with pre-post workshop	Graduate students (Jordan)	Questionnaire on manuscript writing & research integrity	Baseline awareness was low. Workshop improved knowledge in fabrication, falsification, conflicts of interest, and authorship, though gaps remained.
Fanelli	2009	Meta-analysis of surveys	International scientists	Self-report surveys on misconduct	Found falsification more frequently admitted than fabrication. Highlighted prevalence of misconduct and awareness gaps.
Greco et al.	2024	Institutional RI course (pre-post)	Early career researchers (Italy)	Surveys + qualitative feedback	Participants had relatively high baseline knowledge. Course improved understanding of fabrication, falsification, conflicts of interest, and authorship. Fraud remained difficult.
Fabbri et al.	2025	Educational intervention on COI & corporate influence	University of Bath participants	Pre-post surveys + case-based exercises	Improved recognition of financial conflicts of interest and understanding of corporate influence on science. Interactive methods were valued.
Jin et al.	2024	Cross-sectional descriptive study	Researchers in East Asia	Survey of authorship criteria awareness (ICMJE)	Showed relatively high baseline knowledge of authorship rules. Misconceptions persisted around gift authorship.
Our study	2025	pre-post quasi-experimental study, Morocco	Postgraduate health science students.	Structured questionnaire on research integrity	Improved knowledge in falsification, fabrication, and conflicts of interest.

3. Impact of the training program on Attitude regarding research integrity.

Our results demonstrated a positive impact of the training program on our participants' attitude towards research integrity. The participants showed a statistically significant improvement in their total attitude score following the intervention, increasing from 85.62 ± 14.80 before the training to 91.51 ± 8.25 after the training ($p < 0.001$). This finding indicates a global enhancement in ethical attitudes and suggests that the training program was effective in promoting more responsible conduct of research.

Similar to our study, Abd ElHafeez(25) et al. also reported that participants with prior research integrity training demonstrated significantly more attitude towards scientific misconduct compared to those without training. The authors reported that attitudes toward misconduct were particularly sensitive to educational exposure thus the need for training program.

Zeljic et al.(26) also reported that students who had received formal research integrity education exhibited significantly more ethical attitudes compared to untrained students. The trained participants showed stronger rejection to research misconduct practices and possessed more positive attitude towards responsible conduct of research. Falola et al(27) was also consistent with our results. Their study reported significant increase in positive attitude towards research after an intervention and a notable decline in the negative attitude section.

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Table 9: Summary of results from our study on general attitude compared to previous studies.

Author(s)	Year	Study design / Setting	Sample	Measuring tools	Results
Zeljic et al	2020	Cross-sectional survey, University of Belgrade	Biology students	Research integrity awareness questionnaire	students who had received formal research integrity education exhibited significantly more ethical attitudes compared to untrained students.
Abd ElHafeez et al	2022	Validation study, Middle Eastern academic institutions	Researchers and graduate students	Attitude scale regarding Responsible Conduct of Research (RCR)	Participants with prior exposure to research integrity training demonstrated significantly more appropriate attitudes toward scientific misconduct compared to those without training.
Falola et al.	2025	Quasi-experimental, structured training program in medical education	Medical students (Nigeria, multi-institution)	Research self-efficacy and attitude questionnaires	Structured training improved attitudes toward research and increased motivation
Our study	2026	pre-post quasi-experimental study, Morocco	Postgraduate health science students	Attitude scale on responsible conduct of research	Training program led to a significant increase in positive attitudes toward research

4. Impact of the Training Program on Attitude of Specific Domains:

4.1 Attitudes toward Research Ethics:

On items related to ethical approval, informed consent, and confidentiality, there was an increase in the mean score of all three items but our results showed no statistical significant improvement after the intervention because participants already demonstrated favourable attitude toward core ethical principles prior to the training. For example,

- 78.7% of participants strongly disagreed with “using participants’ confidential information without their informed consent” before the intervention.
- 76.6% of participants strongly disagreed with “Not obtaining proper informed consent from participants”
- There was major improvement of participants attitude towards ethical approval, 61.7% of participants strongly disagreed with “Conducting research on human beings without the prior approval of an ethics committee” before the intervention while 72.3% strongly disagreed after.

These results suggest that participants already possessed positive attitude towards responsible conduct of research prior to the intervention which led to no significant statistical improvement.

Similarly, in a study by Abd El-Hafeez et al.(25) On Reliability and validation of an attitude scale regarding responsible conduct in research, it was also reported that participants possessed positive attitude towards research ethics principles, with only modest differences associated with prior training program.

This may suggest fundamentally strong ethical norms even without training.

4.2 Attitude towards Data Fabrication and Falsification:

Even though participants demonstrated negative attitude towards questionable research practices initially, there was still a major improvement in their attitude towards responsible conduct of research after the intervention. Our results showed showed statistically significant improvements across all items.

Participants demonstrated stronger rejection of:

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- Making up research data ($p = 0.008$).
- Changing data without mentioning it ($p = 0.031$).
- Dropping “outliers” without mentioning it ($p = 0.014$).
- Selectively only those data that support your hypothesis ($p = 0.027$).

In comparison, Abd El-Hafeez et al.(25) reported that training on research integrity is strongly associated with positive attitude towards fabrication, falsification and selective reporting. Similarly Zeljic(26) also reported participants with prior training possessed more positive attitude towards responsible conduct of research.

These findings support the fact that training plays a critical role in improving attitudes toward data fabrication and falsification.

4.3 Attitude towards Plagiarism:

There was improvement in participants' attitude towards plagiarism with two out of the three items being statistically significant. Even with this improvement participants already showed strong rejection towards plagiarism before the intervention. For example,

- [25]89.3% disagreed with “Using someone else’s words or ideas without giving proper credit” before the intervention.
- 78.7% of participants strongly disagreed with “submitting a manuscript to a journal that you already published in another journal” before the intervention.

Even though there was no statistical significance on the item “using someone else’s words or ideas without giving proper credit”, participants already showed strong rejection before the intervention.

This is similar to Abd El-Hafeez et al.(25) study, where plagiarism related items showed clear differentiation between trained and untrained participants, with trained individuals expressing stronger rejection of using others' work without attribution and duplicate publication. Similarly Landau(28) also stated that proactive teaching methods can significantly reduce plagiarism.

These results reiterate the need for training on research integrity to promote responsible conduct of research.

4.4 Attitude towards Authorship:

Concerning the authorship domain, participants demonstrated positive attitude towards responsible conduct of research. Improvement was noted and all three items with two out of them being statistically significant:

- Attitudes toward “granting authorship credit to someone who has not contributed substantively to a manuscript.” ($p = 0.002$)
- “Allowing your name to be put on papers to which you have made no reasonable contribution.” ($p = 0.003$).
- On “Denying authorship credit to someone who has contributed substantively to a manuscript”, results shifted positively towards responsible conduct of research with 78.7% of participants strongly disagreeing after the intervention compared to 61.7% initially.

Similarly, in the Abd El-Hafeez et al. scale, trained participants demonstrated more appropriate attitudes toward honorary authorship and inappropriate attribution of credit. However, the authors also noted that certain authorship-related attitudes may be influenced by academic hierarchy and cultural norms.

4.5 Attitude towards Conflict of Interest:

Attitudes related to conflict of interest demonstrated positive but mixed results towards responsible conduct of research. There was fair improvement observed for awareness and disclosure of conflicts of interest but these changes did not reach statistical significance. In contrast, attitudes toward altering or suppressing research results under external pressure showed a statistically significant improvement ($p = 0.041$).

In the Abd El-Hafeez et al. study, attitudes toward conflict of interest and external pressures showed weaker associations with prior training compared to other domains. The authors emphasized that conflict of interest attitudes are shaped not only by individual knowledge but also by institutional culture and enforcement mechanisms.

Impact of a short training program on the knowledge and attitude of postgraduate health science students regarding research integrity.

Table 10: Summary of results of the impact of the training program on specific domains on attitude from our study compared to previous studies.

Author(s)	Year	Study design / Setting	Sample	Measuring tools	Results
Our study	2026	pre-post quasi-experimental study, Morocco	Postgraduate health science students	Responsible Conduct of Research (RCR) Attitude Scale	The training program led to an overall improvement in participants' attitudes toward research integrity. Notable positive changes were observed in attitudes related to data fabrication and falsification, plagiarism, and authorship. Attitudes toward conflict of interest also improved for several items. Attitudes toward responsible conduct of research showed a positive trend, although the change was less pronounced. Overall, the training reduced the acceptability of scientific misconduct.
Abd El-Hafeez et al.	2022	Cross-sectional validation study / University setting	Medical and postgraduate students	Responsible Conduct of Research (RCR) Attitude Scale	Participants who had previously received research integrity training demonstrated more positive attitudes toward responsible conduct of research compared to those without prior training. Prior training was associated with lower tolerance toward scientific misconduct and more appropriate attitudes across domains including plagiarism, data falsification, authorship, and conflict of interest.

5. Satisfaction:

The participants generally expressed high satisfaction concerning the training program across all three sections.

- Over 90% of participants agreed with all three propositions that the objectives of the training program were met, that the length of the training was adequate and that the content of the course was addressed with sufficient depth.
- Over 90% of participants agreed that the training methods were well suited to the objectives, promoted active participation, facilitated the sharing of professional experiences, and were supported by a realistic, practical approach, high-quality documentation, and an appropriate training environment. With only 2.1% of participants disagreeing with “The training enabled me to share professional experiences with colleagues.”
- All the participants agreed with the usefulness of the training program and that it merits a good overall rating.

Similarly, Aggarwal et al.(29) compared online and on-site training in health research methodology. In their randomized study, participants in both training modalities reported high satisfaction with course content, teaching methods, and overall learning experience, indicating that well-structured research training programs are generally well received regardless of delivery format.

Impact of a short training program on the knowledge and attitude of postgraduate health science students regarding research integrity.

Table 1: Summary of results of satisfaction from our study compared to previous studies

Author(s)	Year	Study design / Setting	Sample	Measuring tools	Results
Your study	2026	pre-post quasi-experimental study, Morocco	Postgraduate health science students	F.P. Holgado-Tello et al. Training Satisfaction Rating Scale	Participants perceived the training objectives as being clearly met and the content as relevant to their research needs. Participants agreed with the usefulness of the training program and that it merits positive ratings.
Aggarwal et al.	2011	Randomized study; comparison of online vs. on-site training in health research methodology	84 participants (India, Uganda, USA) randomized to online vs. on-site formats	Pre/post questionnaires assessing knowledge, attitudes, satisfaction	Participants perceived the training objectives as being clearly met and the content as relevant to their research needs.

Recommendation

Impact of a short training program on the knowledge and attitude of postgraduate health science students regarding research integrity.

To start, research integrity training should be formally integrated in the curricula of all universities and not just postgraduate curriculum. Early exposure to responsible conduct of research is crucial to enable students to acquire the necessary knowledge and attitude before starting independent research work.

Information on research integrity should be readily available and easy to access. Workshops and focus groups should also be held regularly to reinforce responsible conduct of research and to prevent knowledge loss.

Research integrity training should be made obligatory for all students before the start of the start of their thesis to ensure a standardised level of ethical principle awareness.

Periodical training and sensitization of supervisors on research ethics should also be recommended to ensure a positive research environment and to reinforce ethical awareness among students.

Finally, establishing a monitoring and evaluation systems will go a long way in assessing the long term impact of research integrity training on actual research practices. Longitudinal studies are recommended to evaluate whether improvements in knowledge and attitudes translate into sustained ethical conduct in research.

Strengths and limitations

1. Strengths:

Our study addressed an important and underexplored area by evaluating research integrity among postgraduate students; a population that is responsible for future scientific research outputs . We also used a pre post intervention design to evaluate the impact of the training program unlike most studies. The intervention covered key domains of scientific misconducts and responsible conduct of research while using validated tools to collect data, to acquire accurate and credible results.

Our study also addressed participants from different institutions and study levels which did not restrict the generalization of the results.

2. Limitations:

Our study was limited by the sample size which may not the generalization of the results. The use of self reporting data may cause information bias especially for such a sensitive subject. The timing of the intervention may not have been sufficient to cover in depth the different domains of research integrity. Our study did not have a control group which limits the ability to attribute the improvements we observed solely on the intervention. The short follow up evaluation of improvement does not allow us to evaluate long term retention of knowledge or sustainable behavioural change.

Conclusion

The study described the impact of a short training program on the perception of knowledge and attitude of health science students regarding research integrity and examined key changes in key ethical domains. The findings from the study demonstrated a marked improvement following the intervention, indicating that structured training can positively influence ethical awareness and positioning toward responsible research conduct. Before the intervention, different levels of acceptability towards unethical research practices were noted. Post intervention results showed a fundamental shift toward rejection of misconduct, particularly in areas related to data fabrication and falsification, plagiarism, inappropriate authorship, and undisclosed conflicts of interest.

Knowledge toward research integrity was also influenced improved by the intervention, highlighting the role of formal ethics education in shaping responsible conduct of research. Participants demonstrated improved ability to recognize unethical practices and expressed stronger ethical positioning after the training, emphasizing research integrity as a learned and reinforced competency rather than an inherited trait. These findings support the view that research integrity functions as an academic and ethical gradient, influenced by exposure to training, mentorship, and institutional culture.

Overall, the results emphasize the necessity of integrating structured and standardized research integrity training into undergraduate and postgraduate curricula. Ethics education should be accessible, practical, and context-relevant to enable students to understand, interpret, and apply principles of responsible research conduct in real-world settings. Future studies should consider longitudinal designs to assess the sustainability of these improvements over time and explore the impact of repeated or extended training programs on actual research practices.

ABSTRACT

Abstract

Introduction: Research integrity is a fundamental pillar of high-quality scientific research and ethical academic practice. However, concerns regarding research misconduct persist, particularly among postgraduate students who are actively engaged in research activities. Structured training programs have been proposed as an effective strategy to strengthen knowledge, attitudes, and perceptions related to responsible research conduct.

Objectives: To assess the impact of a short training program on the knowledge, attitudes, and perceptions of research integrity among postgraduate health science students.

Methods: We conducted a quasi-experimental pre-post intervention study among postgraduate health science students. Participants were assessed before and after a short research integrity training program using a structured questionnaire covering key domains of research integrity, including data management, plagiarism, authorship, conflicts of interest, and research ethics. Data were collected and analyzed using SPSS software. Descriptive and comparative analyses were performed to evaluate changes following the intervention.

Results: A total of 47 postgraduate students participated in the study. Prior to the training, varying levels of knowledge and mixed attitudes toward research integrity were observed, with some degree of acceptability toward unethical research practices. Following the intervention, participants demonstrated improved knowledge and a marked positive shift in attitudes, characterized by stronger rejection of research misconduct across all assessed domains. The greatest improvements were observed in attitudes toward data fabrication and falsification, plagiarism, inappropriate authorship practices, and undisclosed conflicts of interest.

Conclusion: The study demonstrated that a short, structured training program can effectively improve postgraduate students' knowledge, attitudes, and perceptions regarding research integrity. These findings highlight the importance of integrating formal research integrity training into postgraduate curricula to promote ethical research conduct and strengthen responsible research practices.

Résumé

Introduction : L'intégrité scientifique est un pilier fondamental de la recherche scientifique de haute qualité et des pratiques académiques éthiques. Cependant, les préoccupations relatives à la fraude scientifique persistent, notamment chez les étudiants de troisième cycle qui participent activement à des activités de recherche. Des programmes de formation structurés ont été proposés comme une stratégie efficace pour renforcer les connaissances, les attitudes et les perceptions liées à une conduite responsable de la recherche.

Objectifs : Évaluer l'impact d'un programme de formation court sur les connaissances, les attitudes et les perceptions de l'intégrité scientifique chez les étudiants de troisième cycle en sciences de la santé.

Méthodes : Nous avons mené une étude quasi expérimentale avant-après intervention auprès d'étudiants de troisième cycle en sciences de la santé. Les participants ont été évalués avant et après un court programme de formation à l'intégrité scientifique à l'aide d'un questionnaire structuré couvrant les principaux domaines de l'intégrité scientifique, notamment la gestion des données, le plagiat, la paternité des publications, les conflits d'intérêts et l'éthique de la recherche. Les données ont été recueillies et analysées à l'aide du logiciel SPSS. Des analyses descriptives et comparatives ont été réalisées pour évaluer les changements survenus après l'intervention.

Résultats : Au total, 47 étudiants de troisième cycle ont participé à l'étude. Avant la formation, on observait des niveaux de connaissances variables et des attitudes mitigées envers l'intégrité de la recherche, avec une certaine tolérance envers les pratiques de recherche contraires à l'éthique. Après l'intervention, les participants ont démontré une amélioration de leurs connaissances et une nette évolution positive de leurs attitudes, caractérisée par un rejet plus ferme des manquements à l'intégrité scientifique dans tous les domaines évalués. Les améliorations les plus importantes ont été observées concernant les attitudes envers la fabrication et la falsification de données, le plagiat, les pratiques d'attribution de la paternité inappropriées et les conflits d'intérêts non déclarés.

Conclusion : L'étude a démontré qu'un programme de formation court et structuré peut améliorer efficacement les connaissances, les attitudes et les perceptions des étudiants de troisième cycle en matière d'intégrité de la recherche. Ces résultats soulignent l'importance d'intégrer une formation formelle à l'intégrité de la recherche dans les cursus de troisième cycle afin de promouvoir une conduite éthique de la recherche et de renforcer les pratiques de recherche responsables.

الملخص

المقدمة: تُعد نزاهة البحث العلمي ركيزة أساسية لضمان جودة البحث والممارسة الأكاديمية الأخلاقية. ومع ذلك، لا تزال قضايا سوء السلوك البحثي قائمة، لا سيما بين طلبة الدراسات العليا المنخرطين بشكل مباشر في الأنشطة البحثية. وقد تم اقتراح البرامج التدريبية المنظمة كوسيلة فعالة لتعزيز المعرفة والمواقف والتصورات المتعلقة بالممارسات المسؤولة في البحث العلمي.

الأهداف: تهدف هذه الدراسة إلى تقييم تأثير برنامج تدريبي قصير على المعرفة والمواقف والتصورات المتعلقة بنزاهة البحث العلمي لدى طلبة الدراسات العليا في العلوم الصحية.

المنهجية: أجريت دراسة شبه تجريبية بتصميم قبل-بعد التدخل شملت طلبة الدراسات العليا في العلوم الصحية. تم تقييم المشاركين قبل وبعد تنفيذ برنامج تدريبي قصير حول نزاهة البحث العلمي باستخدام استبيان مُنظم يغطي المحاور الأساسية لنزاهة البحث، بما في ذلك إدارة البيانات، والانتحال العلمي، وقضايا التأليف، وتضارب المصالح، وأخلاقيات البحث. جُمعت البيانات وتم تحليلها باستخدام برنامج SPSS. أُجريت تحليلات وصفية ومقارنة لتقييم التغيرات الناتجة عن التدخل التدريبي.

النتائج: شارك في الدراسة عدد من طلبة الدراسات العليا. قبل التدخل التدريبي، لوحظت مستويات متفاوتة من المعرفة ومواقف متباينة تجاه نزاهة البحث العلمي، مع وجود درجة من تقبل بعض الممارسات البحثية غير الأخلاقية. بعد البرنامج التدريبي، أظهر المشاركون تحسناً ملحوظاً في المعرفة وتحولاً إيجابياً في المواقف، تمثل في رفض أقوى لمختلف أشكال سوء السلوك البحثي عبر جميع المحاور المدروسة. وسُجلت أبرز التحسينات في المواقف المتعلقة بتزوير البيانات وتلفيقها، والانتحال العلمي، وممارسات التأليف غير المناسبة، وعدم الإفصاح عن تضارب المصالح.

الخلاصة: أظهرت الدراسة أن البرنامج التدريبي القصير والمنظم كان فعالاً في تحسين معرفة طلبة الدراسات العليا ومواقفهم وتصوراتهم المتعلقة بنزاهة البحث العلمي. وتؤكد هذه النتائج على أهمية إدماج التدريب على نزاهة البحث العلمي ضمن مناهج الدراسات العليا لتعزيز الممارسات البحثية الأخلاقية وترسيخ ثقافة البحث المسؤول.

خطة علاجية مكثفة حسب المرحلة في الفطار الفطرائي.

QUESTIONNAIRE ON THE IMPACT OF A SHORT TRAINING PROGRAM ON THE PERCEPTION OF KNOWLEDGE AND ATTITUDE OF POSTGRADUATE HEALTH SCIENCE STUDENTS REGARDING RESEARCH INTEGRITY.

This study was conducted to assess the impact a short training program on the perception of knowledge and attitude of health science students regarding research integrity.

The research work was supervised by the department of public health and community medicine of the faculty of medicine and pharmacy of Marrakech.

Researchers:

Pr ADARMOUCH LATIFA (Main supervisor)

Team:

Pr ESSOLI

Dr CHEBRAOUI

Alpha Omar Jangum

Annexes 1

✓ Research Protocol.

PROTOCOLE DE RECHERCHE

Titre de la thèse : Impact d'un court programme de formation sur les connaissances et l'attitude des étudiants en sciences de la santé de troisième cycle concernant l'intégrité de la recherche

Directeur de thèse : Pr. ADARMOUCH LATIFA

Durée : un an

Date de début : octobre 2024.

Problématique :

La recherche scientifique repose sur des principes fondamentaux d'intégrité, d'honnêteté et de responsabilité. Cependant, de nombreuses études ont montré une méconnaissance et un manque de formation adéquate sur les principes de l'intégrité scientifique parmi les étudiants en sciences de la santé.

Ce déficit de connaissances et d'attitudes appropriées face à la conduite responsable de la recherche peut conduire à des pratiques inappropriées, telles que le plagiat, la falsification, fabrication ou la manipulation de données.

Objectifs de l'étude :

Évaluer l'impact d'une formation de courte durée en intégrité de la recherche sur les connaissances et les attitudes des étudiants de troisième cycle en sciences de la santé.

Méthodologie :

Type d'étude :

Étude quasi-expérimentale avec évaluation pré- et post-formation.

Population cible :

Étudiants de troisième cycle en sciences de la santé

9. Considérations éthiques :

Consentement éclairé avant l'intervention

Respects de confidentialité de données

11. Résultats attendus :

- Amélioration significative du niveau de connaissance et de l'attitude positive envers l'intégrité en recherche.
- Meilleure compréhension des principes éthiques et des pratiques responsables en recherche.

Annexes 2

✓ Questionnaire:

Data collected from this survey was anonymous with an average time of about 15 minutes.

J'accepte volontairement de participer à cette étude et je donne mon consentement éclairé

Oui / non

1_caractéristiques

Les initiales de votre nom et prénom (exemple : Morad Alaoui = MA)

La date de naissance

Sexe : homme /femme

Niveau d'étude :

Résident
Master 2ème année
Doctorat(PhD)

Année d'étude

1ère année
2ème année
3ème année
4ème année
5ème année
6ème année

2- Expérience en recherche

Avez-vous déjà élaboré un protocole de recherche ou un plan d'étude ?

Oui / non

Avez-vous déjà publié un article de recherche dans une revue évaluée par des pairs ?

Oui/non

Avez-vous présenté votre recherche lors d'une conférence ou d'un séminaire ?

Oui/non

Avez-vous reçu une formation sur l'intégrité en recherche?

Oui/non

Impact of a short training program on the knowledge and attitude of postgraduate health science students regarding research integrity.

Dans quelle mesure êtes-vous d'accord : « Je me sens suffisamment formé en éthique de la recherche. »

Fortement en désaccord
En désaccord
D'accord
Entièrement d'accord

Dans quelle mesure êtes-vous d'accord "Compréhension de l'intégrité de la recherche et des connaissances sur les méconduites scientifique"

Fortement en désaccord
En désaccord
D'accord
Entièrement d'accord

Dans quelle mesure êtes-vous d'accord "Connaissance des mesures disciplinaires liées aux méconduite scientifique dans votre établissement"

Fortement en désaccord
En désaccord
D'accord
Entièrement d'accord

3_Les connaissances des jeunes chercheurs en matière d'intégrité

Dans cette section, veuillez cocher la ou les réponses que vous jugez correctes.

1_ Connaissance –La fraude scientifique

Se limite au processus de publication.

Peut être commise par négligence.

Concerne toute erreur dans un article scientifique.

Traduit une violation de la déontologie et de l'éthique.

2-Connaissance –La falsification de données

Une pratique acceptable si elle permet de clarifier les résultats.

Une fabrication de données nouvelles

Un changement ou omission des résultats de la recherche.

Une inclusion non justifiée d'une personne dans la liste des auteurs

3-Connaissance – La fabrication de données

Une manipulation du matériel, de l'équipement ou des processus de la recherche.

Une création de données de recherche fictives.

Une modification légère des chiffres réels pour les rendre plus cohérents.

Une suppression de données jugées « inutiles » afin de simplifier le rapport.

4- Connaissance–Le conflit d'intérêt correspond au fait que:

Le participant accepte de participer à la recherche pour bénéficier d'un nouveau médicament

Le chercheur est tiraillé entre son intérêt vers la recherche et son devoir de respecter le participant

Le chercheur recrute les participants pour utiliser leurs données personnelles dans la recherche.

Le patient pense que la participation à la recherche fait partie aux soins médicaux

5- Connaissance –On parle de conflits d'intérêts dans le cadre de la recherche lorsque

Le chercheur ne réussit pas à communiquer les bénéfices de la recherche

Le chercheur a des intérêts personnels influençant son comportement

Le chercheur utilise les participants pour obtenir les données

Le chercheur donne une rémunération aux participants pour les recruter

6- connaissance –Qui doit faire partie de la liste des auteurs dans un article scientifique?

Toute personne travaillant dans le même service ou laboratoire de recherche.

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Toute personne ayant contribué à la conception de la recherche

Toute personne ayant participé à recruter des participants

Toute personne qui participe à la prise en charge médicale du patient

7- Connaissance –Dans le domaine de la recherche, la fraude scientifique correspond à:

De la tricherie

De l'ignorance

De l'incompétence

De l'incohérence

8- connaissance–Parmi les formes de méconduite scientifique, on trouve:

L'indemnisation des participants à la recherche.

Le financement par un organisme privé

La non déclaration des conflits d'intérêts

L'indemnisation des enquêteurs

9–Connaissance –La création de données de recherche correspond à:

La certification des données

La manipulation des données

L'exploitation des données

La fabrication des données

10–connaissance –La modification des résultats de recherche pour prouver son hypothèse correspond à:

La fabrication des données

La falsification des données

L'adaptation des données

L'entraînement des données

4-Les attitudes des jeunes chercheurs vis-à-vis de l'intégrité

Veillez exprimer votre degré d'accord avec les affirmations suivantes : échelle de Likert en cinq points allant de « Pas du tout d'accord » à « Tout à fait d'accord »

Attitude [Je suis préoccupé par l'ampleur de la méconduite scientifique dans mon contexte]

Attitude La responsabilité de la méconduite scientifique incombe principalement à l'investigateur principal

Attitude [Les investigateurs devraient signaler les cas de la méconduite scientifique]

Attitude [Les investigateurs devraient déclarer les conflits d'intérêts aux autorités approprié

Attitude [Les superviseurs doivent surveiller le travail des jeunes pour s'assurer qu'ils deviennent des chercheurs responsables

Attitude La conduite de recherche sur des êtres humains sans l'approbation préalable d'un comité d'éthique.

Attitude L'utilisation d'informations confidentielles sur les participants sans leur autorisation.

Attitude [La non obtention du consentement éclairé approprié des participants]

Attitude [La création des données de recherche]

Attitude [La modification des données de recherche sans le mentionner]

Attitude [La suppression des « valeurs aberrantes/extrêmes » sans le mentionne]

Attitude [La sélection des données qui soutiennent l'hypothèse uniquement .]

Attitude [La publication des résultats qui appartiennent à quelqu'un d'autre]

Attitude [L'utilisation des mots ou idées de quelqu'un d'autre sans lui attribuer correctement une reconnaissance

Attitude Soumettre un manuscrit à une revue alors qu'il a déjà été publié dans une autre revue.

Attitude [Accorder le statut d'auteur à quelqu'un qui n'a pas contribué de manière substantielle au manuscrit,

Attitude Refuser d'accorder le statut d'auteur à une personne qui a contribué de manière substantielle au manuscrit.

Attitude Permettre que son nom soit inscrit sur des articles auxquels on n'a pas apporté de contribution raisonnable

Attitude [Être conscient d'un conflit d'intérêt (par exemple un médecin réalise une étude clinique sur un médicament fabriqué par un laboratoire qui lui verse régulièrement des honoraires pour des conférences) et ne pas le déclarer au comité d'éthique ni à la revue.

Attitude Compromettre la rigueur du design ou de la méthodologie d'une étude sous la pression d'un financeur commercial ou associatif.

Attitude La modification ou la suppression de manière inappropriée, des résultats de la recherche en réponse à la pression d'une source de financement lucrative ou non lucrative

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Questionnaire de satisfaction de formation

Merci d'évaluer chaque déclaration sur une échelle de 1 (fortement en désaccord) à 5 (fortement d'accord), selon votre perception de la formation

À mon avis, les objectifs prévus ont été atteints.
Les problèmes ont été traités aussi en profondeur que la durée du cours le permettait.
La durée du cours était adéquate pour les objectifs et le contenu.
La méthode était bien adaptée aux objectifs et au contenu.
La méthode utilisée nous a permis de participer activement à la formation.
La formation m'a permis de partager des expériences professionnelles avec des collègues.
La formation était réaliste et pratique.
La documentation fournie était de bonne qualité.
Le contexte de formation était bien adapté au processus de formation.
La formation reçue est utile pour mon travail spécifique.
La formation reçue est utile pour mon développement personnel.
La formation mérite une bonne évaluation globale.

ANNEXES 3

✓ Attitude scale for responsible conduct of research

Table 1. Items in the attitude scales.

Attitude Scale #1: Attitudes toward the acceptability of RCR practices	
Compliance with research ethics regulations	
RE_1	Conducting research involving human subjects without prior approval from an Institutional Review Board or Ethics Committee
RE_2	Use of confidential information about research subjects without their authorization
RE_3	Not obtaining proper informed consent from participants
Data Fabrication and Falsification	
DFF_1	Making up research data
DFF_2	Changing research data without mentioning it
DFF_3	Dropping “outliers” without mentioning it
DFF_4	Selecting only those data that support your hypothesis
Plagiarism	
Plag_1	Publishing results that belong to someone else
Plag_2	Using someone else’s words or ideas without giving proper credit
Plag_3	Submitting a manuscript to a journal that you already published in another journal
Authorship misconduct	
Authorship_1	Giving authorship credit to someone who has not contributed substantively to a manuscript
Authorship_2	Denying authorship credit to someone who has contributed substantively to a manuscript
Authorship_3	Allowing your name to be put on papers to which you have made no reasonable contribution
Conflict of interest.	
COI_1	Awareness of a conflict of interest (e.g., you have a financial interest with a drug company, and you are conducting a study for them) and did not disclose it to either the ethics committee or a journal
COI_2	Compromising the rigor of a study’s design or methodology in response to pressure from a commercial or not for profit funding source
COI_3	Inappropriately altering or suppressing research results in response to pressure from a commercial or not for profit funding source
Attitude Scale #2: General attitudes toward scientific misconduct	
SM_1	I’m concerned about the amount of misconduct that occurs
SM_2	The responsibility for misconduct lies with the principal investigator only
SM_3	Investigators should report instances of research misconduct
SM_4	Investigators should declare conflicts of interest to the appropriate officials
SM_5	I should monitor my trainees’ work to ensure that they are developing into responsible researchers

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Annexes 4

✓ Holgado-tello et al. Training Satisfaction Rating Scale

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Table 2. Loading pattern and factor correlations (*italics*); the highest loadings are shown in **bold**.

Items	F 1	F 2	F 3
Objectives and content (F1)		<i>.623</i>	<i>.623</i>
1. In my opinion the planned objectives were met (OBJ1)	.751	.016	.142
2. The issues were dealt with in as much in depth as the length of the course allowed (OBJ2)	.724	-.029	.125
3. The length of the course was adequate for the objectives and content (OBJ3)	.691	.062	-.088
Method and training context (F2)			<i>.681</i>
4. The method was well suited to the objectives and content (MET4)	.555	.345	.043
5. The method used enabled us to take an active part in training (MET5)	.142	.842	-.123
6. The training enabled me to share professional experiences with colleagues (MET6)	-.077	.535	.181
7. The training was realistic and practical (MET7)	.266	.347	.324
8. The documentation given out was of good quality (MET8)	.289	.099	.322
9. The training context was well suited to the training process (MET9)	-.019	.194	.315
Usefulness and overall rating (F3)			
10. The training received is useful for my specific job (USE10)	.042	-.058	.793
11. The training received is useful for my personal development (USE11)	.040	-.036	.855
12. The training merits a good overall rating (USE12)	.385	.088	.524

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قسم الطبيب

أقسم بالله العظيم

أن أراقب الله في مهنتي.

وأن أصون حياة الإنسان في كافة أطوارها في كل الظروف
والأحوال باذلاً وسعي في إنقاذها من الهلاك والمرض
والألم والقلق.

وأن أحفظ للناس كرامتهم، وأستر عورتهم، وأكتم سرهم.
وأن أكون على الدوام من وسائل رحمة الله، باذلاً رعايتي الطبية للقريب والبعيد،
للصالح والطالح، والصديق والعدو.
وأن أثابر على طلب العلم، وأسخره لنفع الإنسان لا لأذاه.
وأن أوقّر من علّمني، وأعلّم من يصغرنني، وأكون أخاً لكل زميل في المهنة الطبية
متعاونين على البر والتقوى.

وأن تكون حياتي مصداق إيماني في سري وعلايتي،
نقية مما يشينها تجاه الله ورسوله والمؤمنين.

تأثير برنامج تدريبي قصير على معارف ومواقف طلبة الدراسات العليا في علوم الصحة بشأن النزاهة في البحث العلمي

أطروحة

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المزداد في 11 يناير 1999 ببنجول، غامبي

لنيل شهادة الدكتوراه في الطب

الكلمات المفتاحية:

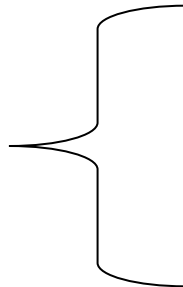
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ن. رضى

أستاذ في طب الاطفال

س. أيت بطهار

أستاذة في طب أمراض الرئة

أ. السباعي

أستاذة في الإعلاميات

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